REMEDIAL INVESTIGATION REPORT

COOPER ROAD AND COMMERCE AVENUE WQARF SITE GILBERT, ARIZONA

Volume I: Text, Tables, and Figures

Task Assignment Number: ADEQ14-077537

June 12, 2015

Prepared for:

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
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Project Number 2010002.80

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Volume II: Appendices A through M

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EXECUTIVE SUMMARY

Hydro Geo Chem, Inc. (HGC) and the Arizona Department of Environmental Quality (ADEQ) have prepared this Remedial Investigation (RI) report for the Cooper Road and Commerce Avenue (C&C) Water Quality Assurance Revolving Fund (WQARF) site in Gilbert, Arizona (Site). This report was prepared to meet the requirements of Arizona Revised Statutes (A.R.S.) § 49-287.03 and Arizona Administrative Code (A.A.C.) R18-16-406, and was performed under ADEQ Task Assignment Number ADEQ12-0084477 and ADEQ14-077537.

The Site incorporates a groundwater solute plume that is located in the vicinity of the former Unichem International, Inc. (Unichem) facility located at 619 West Commerce Road in Gilbert. The former Unichem facility has undergone numerous uses and processes, and disposal practices that have resulted in soil impacted by tetrachloroethene (PCE), other solvents, cyanide and priority pollutant metals. Groundwater beneath the Site is contaminated with PCE, trichloroethene (TCE) and arsenic above maximum contaminant levels (MCLs) or Aquifer Water Quality Standards (AWQS).

Unichem began operations in 1977 and discontinued operations prior to 1983. In July 1983, Unichem sold the property to Aztec Resources, which operated a gold extraction plant using cyanide baths to extract gold from scrap materials and mine tailings. In September 1984, the property was reacquired by Unichem when Aztec Resources defaulted. In 1986, Unichem sold the property to a private owner. The western portion of the former Unichem facility was subsequently sold to Hamilton Test Systems, who operated it as a vehicle emissions testing station. Unichem reacquired the eastern portion of the property in 1988, but did not resume operations. In 1994, Unichem was renamed Simon New Mexico, Inc. when Unichem was acquired by Simon U.S. Holdings as a subsidiary of Simon Group PLC. Simon New Mexico, Inc. subsequently sold all of its other assets to Western Company. Currently the Site is used for storage of construction materials by Skyline Steel.

The Unichem facility is a former Resource Conservation and Recovery Act (RCRA) facility. A RCRA Notice of Violation (NOV) was issued to Unichem in 1989 that required Unichem to prepare a site assessment plan to investigate all potential contamination at the facility. Simon Environmental Engineering, Inc. performed initial environmental investigations that found tetrachloroethene (PCE) in soil borings at concentrations up to 24,000 milligrams per kilogram (mg/kg) and in groundwater samples from three monitoring wells at concentrations up to 6,600 micrograms per liter (µg/L). ADEQ and Simon New Mexico, Inc. worked toward entering into a consent order to conduct site assessment and remediation activities but the consent order was never finalized. Simon New Mexico, Inc. discontinued groundwater monitoring at the Site in

1997. The Site was placed on the WQARF Registry in June 2004 with an Eligibility & Evaluation Score of 33 out of a possible 120.

The predominant contaminant of concern (COC) in the subsurface at the Site is PCE. TCE is also present in lesser amounts. Concentrations of PCE measured in soil vapor and groundwater beneath the Site indicate (at least locally) the presence of non-aqueous phase liquid (NAPL).

In 2005, ADEQ initiated an Early Response Action (ERA) investigation to further define soil and groundwater contamination. During the ERA investigation, the monitor well network at the Site was expanded to further define the magnitude and extent of PCE contamination in groundwater and determine groundwater flow direction. Shallow and deep soil borings were advanced to collect subsurface soil and soil vapor samples and facilitate design of the air sparging/soil vapor extraction (AS/SVE) and groundwater extraction treatment systems. The highest soil PCE concentrations observed, 170 and 3,900 mg/kg, occurred in the lower portions of the deep soil borings, at 60 and 70 feet (ft) below land surface (bls) respectively. Soil PCE concentrations were generally low in the shallow soil borings.

PCE and, to a lesser extent, TCE were detected in soil vapor samples from the former Unichem facility. Soil vapor samples from all but one shallow soil boring showed detectable levels of PCE, with the highest concentrations detected ranging from 2,500 to 29,000 milligrams per cubic meter (mg/m^3). PCE was detected in all soil vapor samples from the deep soil borings and concentrations generally increased with depth. The highest PCE soil vapor concentrations occurred at 60 ft bls, and ranged up to 14,000 mg/m^3. Soil vapor TCE was detected in one deep soil boring at 60 and 70 ft bls at 14 and 11 mg/m^3, respectively. Soil vapor concentrations represent potential impacts to groundwater as they implied soil pore water concentrations ranging up to approximately 18,000 µg/L.

Since 2005, groundwater monitoring has indicated a general increase in water level elevations in the vicinity of the Site; current groundwater elevations in the area are approximately 1,120 ft above mean sea level, corresponding to approximately 120 to 125 ft bls. Increases may be related to the presence of an artificial groundwater recharge facility immediately to the south of the Site. Average horizontal groundwater flow is currently to the northwest with a hydraulic gradient on the order of 0.0005 ft/ft. Groundwater flow direction has varied and in the past was to the west and southwest. Hydraulic testing at the Site indicates that the aquifer has a very high transmissivity. Hydraulic conductivity estimates range from approximately 725 ft/day to 2,015 ft/day. These estimates imply that the rate of solute migration in groundwater beneath the Site is potentially high, although the relatively shallow hydraulic gradient that exists in the area will limit migration rates.

PCE, TCE, and arsenic have exceeded AWQS in at least one monitoring well at the Site. PCE has been detected above the AWQS in 19 of the 26 monitoring wells and in the extraction well, at concentrations up to 6,600 µg/L. The PCE solute plume is currently estimated to be approximately 4,600-ft long and 3,400-ft wide at its maximum. PCE has also been detected from monitoring wells in the deeper aquifer at a concentration exceeding the AWQS. TCE has been detected above the AWQS in four of the 26 monitoring wells, at concentrations up to 40 µg/L. Groundwater PCE and TCE concentrations have generally declined since the initiation of the ERA. Although arsenic has exceeded the AWQS of 10 µg/L in all but four monitoring wells over the historical monitoring period, its presence is attributed to background aquifer geochemical conditions.

The ERA for the Site included the installation and operation of an AS/SVE system and a groundwater extraction system. The AS/SVE system was intended to address PCE contamination in the vadose zone and groundwater at the former Unichem facility. The groundwater extraction system was intended to effect capture of the PCE solute plume in the source area.

Two AS/SVE wells were installed in 2007 to remove PCE from subsurface soil and groundwater using pulsed AS, SVE, and granular activated carbon (GAC) technologies. Three additional SVE wells were installed in 2010 and 2012 to expand the AS/SVE remediation system. The AS/SVE system has been in continuous operation since July 6, 2009 with periodic shutdowns for system modifications, repair, and routine maintenance. Cumulative PCE recovery through December 31, 2013 has been approximately 4,600 pounds (lbs).

A groundwater extraction well was installed in 2006 and an aquifer test was performed in 2007. HGC developed a remedial process design for the removal of PCE from groundwater using groundwater extraction and carbon adsorption treatment technologies with effluent discharged to either the Town of Gilbert sanitary sewer or a Salt River Project (SRP) canal. The water treatment plant was in operation since groundwater extraction system start-up in September 2010 until it was shut down in September 2014. The plant has treated a cumulative total of 193,007,341 gallons of groundwater through the end of September 2014. Approximately 41 lbs of VOCs have been removed by the groundwater treatment system through September 30, 2014.

Operation of the SVE system has removed PCE mass and reduced concentrations in soil, reducing the potential for continuing impacts to groundwater. However, the system is likely to have been relatively ineffective in removing any dense NAPL (DNAPL) PCE that may have been present in fine-grained materials located at depths shallower than 70 ft.

COCs have migrated downward through fine-grained materials in the vadose zone into the underlying vadose zone and saturated gravel. Dissolved COCs are expected to have migrated in the same direction as groundwater. Groundwater flow directions over the period of observation have ranged from generally westward to generally northwestward. Observations of groundwater flow and conservative calculations suggest it would take approximately 8 years for PCE to migrate from the former Unichem facility to its current extent. The former Unichem property is known to have been a source of PCE to groundwater for significantly longer than 8 years, suggesting that remedial activities, natural attenuation, and possible downward migration are limiting the rate of expansion of the PCE plume.

The PCE plume is expected to continue to expand downgradient to the northwest because the majority of the plume is currently not under hydraulic control. Furthermore, migration of PCE from soils to groundwater in areas where soil pore water concentrations remain above groundwater concentrations, and in areas where any residual DNAPL may exist in soils, will contribute to the longevity and continued expansion of the plume. Any residual PCE DNAPL that may exist in the saturated zone will also contribute to the longevity and continued expansion of the plume.

A mix of industrial, commercial and residential land uses prevails within the study area. Several supply wells are located in the Site area that have been impacted or are at risk of being impacted by COCs. In addition, any future development of groundwater resources in the Site vicinity could be impacted by groundwater contamination. Therefore, exposures to COCs due to direct ingestion, inhalation, or dermal contact with contaminated groundwater are considered a complete exposure pathway for the Site. Based on the results of extensive soil and soil vapor sampling at the Site, the presence of commercial workers at the Site, and the potential for future building and development in the Site area, direct contact with soils and inhalation exposure to soil vapor represent exposure pathways for COCs at the Site.

Currently, the most important data gap related to the Site is the incomplete delineation of the groundwater solute plume on its western margin. The solute plume margin is also uncertain to the north and northeast. Additional monitoring wells are recommended to better delineate the plume boundary in these areas. Additional data gaps exist related to the areal and vertical extent and distribution of contamination in groundwater and characterization of the hydrogeologic system. In combination, these data gaps complicate attempts to estimate the total COC mass within the solute plume. The natural attenuation of COCs in groundwater is not defined and the controlling geochemical conditions are not characterized. Additional investigation activities are needed to address the data gaps is necessary to adequately evaluate potential remedial alternatives.

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ACRONYMS AND ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
amsl	above mean sea level
AMA	Active Management Area
APP	Aquifer Protection Permit
ARAR	Applicable or Relevant and Appropriate Requirement
A.R.S.	Arizona Revised Statutes
AS	Air Sparging
ASRAC	Arizona Superfund Response Action Contract
ASTM	American Society of Testing Materials
AWQS	Aquifer Water Quality Standards
AWS	Assured Water Supply
bls	below land surface
C&C	Cooper and Commerce
CAP	Central Arizona Project
CAGRD	Central Arizona Groundwater Replenishment District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-DCE	*cis*-1,2-Dichloroethene
CO_2	Carbon Dioxide
COC	Contaminant of Concern
COPC	Chemical of Potential Concern
COP	City of Phoenix
CN	Cyanide
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DQOs	Data Quality Objectives
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Early Response Action
°F	Fahrenheit
FSP	Field Sampling Plan
FS	Feasibility Study
ft	feet
ft/day	feet per day
ft^2/day	feet squared per day
GAC	Granular activated carbon

ACRONYMS (Continued)

g/cm^3	grams per cubic centimeter
GMA	Arizona Groundwater Management Act of 1980
GPL	Groundwater Protection Level
gpm	gallons per minute
GPS	Global Positioning System
HAPs	Hazardous Air Pollutants
HASP	Health and Safety Plan
HCl	Hydrochloric acid
HDPE	High density polyethylene
HGC	Hydro Geo Chem, Inc.
HGL	HydroGeoLogic, Inc
HHRA	Human Health Risk Assessment
HI	Hazard Index
HP	Horsepower
HQ	Hazard Quotient
HIS	HydroSearch, Inc.
IDW	Investigation Derived Waste
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
LAU	Lower Alluvial Aquifer
lbs	pounds
lbs/ft^3	pounds per cubic foot
LIX	phenolic oxime
LUST	Leaking Underground Storage Tank
MAA	Middle Alluvial Aquifer
MCAQD	Maricopa County Air Quality Department
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MGD	million gallons per day
mL	milliliter
mm	millimeters
MNA	Monitored Natural Attenuation
MTBE	methyl tertiary butyl ether
NAD	North American Datum

ACRONYMS (Continued)

NAPL	Non-Aqueous Phase Liquid
NAVD	North American Vertical Datum
NOV	Notice of Violation
NRF	Neely Recharge Facility
O&M	Operations and Maintenance
ORP	Oxidation Reduction Potential
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic Hydrocarbons
PCE	Tetrachloroethene
PDB	Passive Diffusion Bag
PDO	Pacific Decadal Oscillation
PEL	Permissible Exposure Limit
PID	photo-ionization detector
ppm	parts-per-million
ppmv	parts-per-million by volume
psi	pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RfC	Inhalation Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RO	Remedial Objective
RPD	Relative Percent Difference
RSL	Regional Screening Level
RWCD	Roosevelt Water Conservation District
SAP	Site Assessment Plan
SC	Specific Conductivity
scf	standard cubic feet
scfm	standard cubic feet per minute
SRL	Soil Remediation Levels
SRP	Salt River Project
SVE	Soil Vapor Extraction
TCA	Trichloroethane
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TOG	Town of Gilbert
TPP	Total Priority Pollutants
trans-DCE	*trans*-1,2-dichloroethylene

ACRONYMS (Continued)

TPH	Total Petroleum Hydrocarbons
UAU	Upper Alluvial Unit
US&R	Underground Storage and Recovery Project
UST	Underground Storage Tank
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
VOC	Volatile Organic Compound
WHIP	Well Hydraulics Interpretation Program
WQARF	Water Quality Assurance Revolving Fund
WRF	Water Reclamation Facility
WWTP	Wastewater Treatment Plant
1,2-DCA	1,2-dichloroethane

1. INTRODUCTION

Hydro Geo Chem, Inc. (HGC) was retained by the Arizona Department of Environmental Quality (ADEQ) to prepare this Remedial Investigation (RI) Report for the Cooper and Commerce (C&C) Water Quality Assurance Revolving Fund (WQARF) site in Gilbert, Arizona (Site). This report was prepared to meet the requirements of Arizona Revised Statutes (A.R.S.) § 49-287.03 and Arizona Administrative Code (A.A.C.) R18-16-406, and was performed under ADEQ Task Assignment Numbers ADEQ12-0084477 and ADEQ14-077537.

This RI report summarizes the activities completed as part of the Early Response Action (ERA), including drilling, soil and soil vapor sampling, well installation, groundwater elevation and water quality monitoring within the Site. The information presented in the RI report includes the physical characteristics of the Site; the nature, extent, and sources of the contamination; and the actual and potential impacts of contaminants to public health, welfare, and the environment. The RI report also identifies present and reasonably foreseeable land and waters uses that have been, or are threatened to be, impacted by the contamination.

1.1 Purpose

The purpose of the RI is to obtain adequate information about the contaminants present to define the scope of the problem and determine the appropriate remedial actions needed at the Site. The RI is intended to provide sufficient information to identify appropriate remedial alternatives and technologies for screening during the subsequent Feasibility Study (FS) phase.

1.2 Site Description

The Site incorporates a groundwater solute plume that is located in the vicinity of the former Unichem International, Inc. (Unichem) facility at 619 West Commerce Avenue in Gilbert (Figure 1). The former Unichem facility has undergone numerous uses and processes, and disposal practices have resulted in soil impacted by tetrachloroethene (PCE), other solvents, cyanide and priority pollutant metals. Groundwater beneath the Site is contaminated with PCE, trichloroethene (TCE) and arsenic above maximum contaminant levels (MCLs) or Aquifer Water Quality Standards (AWQS).

The former Unichem facility occupies approximately four acres and currently is used for storage of construction materials by Skyline Steel. The WQARF site boundary is defined by the estimated extent of the PCE 5 microgram per liter (µg/L) isoconcentration in groundwater, estimated to be approximately 4,600-feet (ft) long and 3,400-ft wide at its maximum (Figure 2).

No drinking water wells have been impacted above MCLs or AWQSs by the groundwater contamination at the Site. One of the Town of Gilbert (TOG) drinking water supply wells, TOG #15, is located just over one-half mile down gradient from the Unichem facility and is threatened by the groundwater contamination. TOG #15 is jointly operated by The Salt River Project (SRP) Agricultural Improvement and Power District and also identified as well 29E-1.0S.

SRP also collects water quality samples from well 29E-1.5S located approximately 1,400 ft west of the Unichem facility. PCE was first detected in this well at a concentration of 1.3 µg/L in 2007. A sample collected in 2009 detected PCE at a concentration of 12.4 µg/L.

The TOG operates the Underground Storage and Recovery Project (US&R), located immediately south of the Unichem facility. The TOG US&R project recharges water from the TOG Neely Water Reclamation Facility plant located immediately east of the Unichem facility. The discharges are regulated under Aquifer Protection Permit (APP) number P-102716 issued by ADEQ's Water Quality Division. ADEQ issued an amendment to the APP on October 15, 2007 allowing the TOG to recharge 800,000 gallons per day to the eleven recharge basins. Special provisions were added to the APP such as limiting discharge to the recharge basins immediately south of the Unichem facility in order to minimize the probability that the US&R project would negatively impact the ongoing remediation of contaminants associated with the Cooper and Commerce WQARF site. The TOG also limits the pumping of groundwater recovery wells G-7, G-8 and G-10.

The TOG's well G-9, formerly a point of compliance well for the US&R project, is located approximately 1,600 ft northwest of the Unichem facility near Cooper Road. Groundwater samples collected in 2001 and 2002 from G-9 indicate PCE contamination was present in this well at concentrations ranging from 7.6 µg/L to 90 µg/L.

A groundwater treatment system constructed to remediate contaminated groundwater pumped from extraction well EW-101 began start-up testing on August 2, 2010. The groundwater treatment system began continuous operation on August 25, 2010. Treated groundwater is discharged to the SRP lateral 9.5, located immediately south of the Unichem property.

1.3 Site History

The following sections provide a history of the facility located within the Site source area of interest developed by HydroGeoLogic, Inc (HGL). Pursuant to direction from ADEQ, HGL concentrated its investigative efforts on the facility located within the area of interest that ADEQ believes may have contributed to the contamination at the Site.

1.3.1 Operational History

There is limited information regarding operations at the facility located within the Site source area of interest at 619 West Commerce Avenue. Facility operators based on a review of historical city directories include the following (HGL, 2013):

Operator Name	Time Frame of Operations*
Arma Research**	1977–1978
Chem-Serv**	1978–1979
United Chemical Corp./Unichem International, Inc.	1978–1979
Aztec Resources	1984–1985
Hardison Downey	1987
Auto Inspection Station/Vehicle Inspection Station	1988–1991
K.B. Diesel Works	1993–1999

*The 619 West Commerce Avenue address is not listed in city directories for the years 1970 to 1976, 1980 to 1983, 1986, or 1992.
**Information obtained to date regarding Arma Research and Chem-Serv is considered privileged at this time and, as a result, is not included HGL's letter report.

This section provides information located to date regarding operations for Unichem and Aztec Resources, Inc. (Aztec), the two key companies that operated within the source area of interest.

1.3.1.1 Unichem International, Inc.

Unichem purchased the property at 619 West Commerce Avenue in 1977 and constructed a facility to produce copper sulfate from scrap metal. The copper sulfate production process used aqueous ammonia, phenolic oxime (LIX) blended with kerosene, and sulfuric acid to extract copper from the scrap metal. The plant was designed to produce one ton of product per hour. A diesel-fired boiler with heat exchangers was used to heat the process steam before the crystallization process. PCE was reportedly used as a refrigerant in the crystallization process (HSI, 1995a).

A dry well was constructed on the property in 1977, by Basic Drilling Company, in a triangular-shaped sump near the center of the concrete pavement that served as a foundation for the plant (HSI, 1995a). Environmental investigations at the facility determined that the dry well was constructed to an approximate depth of 42 ft (HSI, 1994).[1]

Prior to 1983, Unichem discontinued operations at the facility and disassembled and sold some of the plant equipment (ADEQ, 2004; HSI, 1995a). In 1986, Unichem sold the property to A. Russell Nielson, who dismantled and disposed of the copper sulfate facilities later that year,

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[1] According to a 1995 Work Plan, the drywell was reportedly constructed to a depth of 79 feet (HSI, 1995a).

leaving only the metal storage building, pavements, and subsurface structures. Mr. Nielson sold the contents of a 10,000-gallon acid storage tank, reportedly sulfuric acid, before removing the tank. It has not been determined if other tanks located at the facility, which were auctioned and removed by the various purchasers, contained materials and how they were disposed of (HSI, 1995a).

Mr. Nielson sold the western portion of the facility to Hamilton Test Systems for use as a vehicle emissions testing station. Unichem reacquired the eastern portion of the property through a bankruptcy court settlement in 1988. However, it appears that Unichem did not resume operations at this time because in 1997, Simon, Inc., the corporate successor to Unichem, requested that the Resource Conservation and Recovery Act (RCRA) identification number for the former Unichem facility be discontinued as no manufacturing activities had occurred at the facility since 1984 (ADEQ, 2002a, 2004; HSI GeoTrans, Inc., 1997).

According to a 1994 site assessment plan, ammonium hydroxide, kerosene, LIX, and sulfuric acid were used at the plant (Simon Hydro-Search, 1994; Unichem, 1994). Operational records indicated that two different LIX products were used, LIX 54 and LIX 64 (Senior, 1978a).

A 1994 response from Simon, Inc., to a request for information letter from ADEQ indicates that PCE was used as a refrigerant and that losses may have occurred (Simon New Mexico, Inc., 1994). However, an equipment list for the copper sulfate plant does not reference a refrigeration unit (Senior, 1978b).

1.3.1.2 Aztec Resources, Inc.

From July 1983 to March 1984, Aztec operated a gold extraction plant at the facility at 619 West Commerce Avenue. Cyanide baths were used to extract gold from scrap materials and mine tailings (Unichem International, Inc., 1983; Ticor Title Insurance Company, 1984; ADEQ, 2002a).

1.3.2 Regulatory Involvement

1.3.2.1 Unichem International, Inc.

On January 12, 1989, the ADEQ Office of Waste Programs inspected the Unichem facility following a December 20, 1988, complaint stating that a “large white tank containing an unknown substance was abandoned on the property.” ADEQ inspected the facility and found that it was being used as a state automobile inspection station and had been in operation for approximately 2 years (ADEQ, 1989a).[2] Following its inspection of the facility, ADEQ contacted Unichem employee Wayne Price in Hobbs, New Mexico, who stated that one small tank containing approximately 600 pounds of liquid copper sulfate and two 55-gallon drums containing solid waste, of unknown origin, were located on the Gilbert property (ADEQ, 1989b). In March 1989, Mr. Price stated that two 6,000-gallon underground storage tanks (USTs) had been removed from the property on February 28, 1989, and that soil samples taken from beneath the USTs had shown no evidence of a release. Mr. Price stated that when the analysis on the two drums was completed, the facility would be "picked up" and any remaining equipment would be transported to Unichem's facility in Hobbs, New Mexico (ADEQ, 1989c).

On February 28, 1989, Unichem removed the two steel 6,000-gallon USTs from the southeast corner of the property. The USTs had been installed in approximately 1983 and were used to store diesel (Unichem International, Inc., 1989a). Total petroleum hydrocarbons (TPH) were not detected in any of the six soil samples taken from beneath the USTs after they had been removed (Unichem International, Inc., 1989b).

On April 28, 1989, Unichem informed ADEQ that it was in the process of removing the following material from its property: a polyethylene tank that contained copper sulfate, two drums containing unknown solid waste content, and a dirt pile from the cleanup of a diesel spill on the property. Unichem did not indicate where the diesel spill had occurred (Unichem International, Inc., 1989b). Unichem reported to ADEQ that tests on the materials in the polyethylene tank and drums had determined that the materials were nonhazardous under RCRA (Unichem International, Inc., 1989c). The drums, polyethylene tank, and dirt pile were removed from the facility and disposed of on July 13, 1989, at a nonhazardous landfill (Unichem International, Inc., 1989d).[3]

On May 1, 1989, Unichem submitted a notification form to the United States Environmental Protection Agency (EPA) for a one-time RCRA identification number and was assigned number AZP982517740. Unichem also submitted a notification form to EPA for a RCRA identification number as a small quantity generator and was assigned number AZR000002550 (Unichem International, Inc., 1989d; EPA, 2005).

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[2] In an April 1989 letter to ADEQ, Unichem stated that the "white UST seen on the property" was the remnant of a vertical polyethylene tank that had been cut in two and used solely for aboveground storage (Unichem International, Inc., 1989b).

[3] The source document does not specify the location where the drums, tank, and dirt were disposed.

On May 11, 1989, ADEQ conducted a hazardous waste inspection of the Unichem property. The property was described as “rectangular with a concrete slab in the center.” In the middle of the concrete slab was a triangular open area that Unichem employees referred to as the “sump drain triangle.” It was also noted that the property had two depressions, one each on the east and south sides of the property, approximately 4 to 6 ft in depth (ADEQ, 1989c). During the inspection, ADEQ collected six soil samples at the following locations: the triangular sump, the pipe inside the triangular sump, north of the sump, the west end of the property, in a depression on the south end of the property, and from the dirt pile on the north end of the property. The two samples taken from within the triangular sump contained elevated levels of total cyanide. The first sample contained cyanide at 41 to 72 parts-per-million (ppm), and the sample taken from the pipe inside the sump drain found cyanide at 133 ppm (ADEQ, 1989c; 1989d). The other samples showed no contamination of metals or organics (ADEQ, 1989d). No visible signs of spills were observed during the inspection (ADEQ, 1989c).

On November 20, 1989, ADEQ issued a notice of violation (NOV) to Unichem as a result of the January 12, 1989, and May 11, 1989, inspections for failure to properly dispose of hazardous waste (ADEQ, 1989e). Results from soil sampling indicated that total cyanide contamination was present above ADEQ’s health-based level of 11 milligrams per kilogram (mg/kg). Unichem was required to submit a site assessment plan (SAP) to determine the nature, extent, and degree of contamination (ADEQ, 1989b; 1989e). In response to the NOV, Unichem stated that it never had used or otherwise handled cyanide at the facility. The NOV stated that Aztec was the operator at the facility and most likely used cyanide in its operations (Holme Roberts & Owen, 1989).

On February 28, 1990, Unichem submitted a SAP to ADEQ as required by the November 20, 1989, NOV (Unichem International, Inc., 1990). In October 1990, Simon Environmental Engineering prepared a subsurface investigation report detailing the test results of soil borings drilled on the Unichem property (Simon-EEI, Inc., 1990).

A December 30, 1993, letter from ADEQ to Unichem indicates that Unichem had contacted ADEQ on December 21, 1993, regarding the compliance status of the Unichem facility. According to ADEQ, the last action related to the facility was Unichem’s submittal of the October 1990 subsurface investigation report summarized above. ADEQ recommended a meeting with Unichem to discuss violations observed at the facility and appropriate actions to achieve compliance.

On April 5, 1994, Unichem submitted an amended SAP to ADEQ to characterize total cyanide, PCE, and TPH at the Site (Simon Hydro-Search, 1994). On April 14, 1994, ADEQ issued conditional approval of the SAP and directed Unichem to cease activities if a dry well was detected on the property. Detection of a dry well would require an amendment to the SAP to include a dry well investigation. Unichem excavated approximately 20 cubic yards of cyanide-contaminated soil from the triangular sump and a dry well was detected (ADEQ, 2002b). On July 6, 1994, Unichem submitted an amended SAP, which ADEQ approved on July 21, 1994 (ADEQ, 2002b).

On December 1, 1994, Simon New Mexico, Inc. (Simon New Mexico) (formerly known as Simon, Inc.) submitted a Site Assessment Phase 1: Monitor Well Installations and Exploratory Borehole report to ADEQ (HSI, 1994). Three groundwater monitoring wells were installed on Site to a total depth of 165 ft, and an exploratory borehole was drilled within the center of the triangular dry well to a depth of 99 ft (HSI, 1994). Soil samples from the boreholes contained significant concentrations of PCE, with a maximum concentration of 24,000 mg/kg at a depth of approximately 70 ft (HSI, 1994; HGC, 2006b) that exceeds the non-residential soil remediation level (SRL) of 13 mg/kg and the groundwater protection level (GPL) of 0.8 mg/kg. Some RCRA metals, including chromium, lead, and mercury, also were detected in the soil samples in total concentrations that exceeded the maximum toxicity levels by a factor of 20 or more (HSI, 1994). Groundwater samples collected from the three monitoring wells contained PCE ranging in concentration from 29 µg/L to 540 µg/L, exceeding the Arizona Aquifer Water Quality Standard (AQWS) limit for PCE of 5 µg/L (HSI, 1994; HGC, 2012).

On June 6, 1995, the ADEQ Hazardous Waste Compliance Unit notified Simon New Mexico of its intent to issue a consent order based on the violations observed during the hazardous waste inspections conducted on January 12 and May 11, 1989 (ADEQ, 1995).

On January 17, 1995, Simon New Mexico submitted a work plan for characterization, remediation, and closure activities as part of its consent order negotiations with ADEQ (HSI, 1995b). Revised work plans were submitted on July 25 and September 22, 1995 (HSI, 1995a; ADEQ, 2002b).

On October 23, 1997, Simon U.S. Holdings, Inc., Simon New Mexico's corporate parent, requested that the RCRA identification number for the former Unichem facility, AZR000002550, be discontinued because no manufacturing activities had occurred at the facility since 1984. The company informed ADEQ that any remediation wastes generated would be handled under provisional generator identification numbers (HSI GeoTrans, Inc., 1997; ADEQ, Files).

On December 13, 2001, ADEQ contacted Clarence Brown, a relative of a former owner of a business near the facility who had contacted John Trujillo of the Town of Gilbert regarding the groundwater contamination in Gilbert. Mr. Brown stated that his deceased brother-in-law was a welder and had owned a steel beam business on the south side of Commerce Avenue. According to Mr. Brown's brother-in-law, a precious metals reclamation business was using an injection well to dispose of waste contaminants. Mr. Brown also stated that at a later date a bus company operated where the precious metals recovery plant had operated (ADEQ HWCU, 2001).

Joni Lindsey of ADEQ compiled information from Cole's directories, the Maricopa County Assessor's Office, and the U.S. Postal Service in response to Mr. Brown's complaint. These sources indicated that a welding company called Desert Welding & Manufacturing had operated at 725 West Commerce Avenue from 1981 to 1982. Nielson Building Materials operated west of this location at 731 West Commerce Avenue during the same time period. Nielson Building Materials also operated at 619 West Commerce Avenue in 1980, then at 620 West Commerce Avenue from 1981 to 1984 and 1986 to 1989, and then as Nielson Lumber Truss from 1990 to 1995 at 620 West Commerce Avenue (ADEQ HWCU, 2001).

From approximately 1981 to 1995, two businesses, Captive Metal Recovery and Commerce Metal Refinery, operated at 635 West Commerce Avenue. Heliotrope Manufacturing operated at 631 West Commerce Avenue from 1979 to 1982, and later Great Dane Bus Line operated at the same address from 1989 to 1990. Based on the information provided by Mr. Brown and information compiled by ADEQ, it appears that the business Mr. Brown's brother-in-law spoke of was Heliotrope Manufacturing. However, little information about the company has been found, and it has not been determined whether the business conducted precious metals recovery (ADEQ HWCU, 2001). Figure 3 depicts the historical business operations in the vicinity of the source area of interest.

On December 6, 2001, ADEQ conducted site visits and evaluated the condition of the three monitoring wells at the facility. During the visit, approximately 35 drums were located on the north side of the property, some of which appeared to contain used oil. Semi trucks were parked on the property, and steel beams and structural materials were being stored on Site by two nearby companies, S&H Steel Company, Inc., and Skyline Steel. Five 55-gallon drums were being stored on the south side of the property, all containing "unknown" materials (ADEQ, 2002c).

On January 18, 2002, Simon New Mexico's legal counsel in Milwaukee, Wisconsin, stated that Simon New Mexico was the legal owner of the property and granted ADEQ access to conduct groundwater sampling (von Brieson, Purtell & Roper, 2002). On January 22, 2002, ADEQ collected groundwater samples from two of the monitoring wells at the facility. The PCE concentrations in the samples exceeded the AWQS limit of 5 µg/L, at 140 µg/L and 1,300 µg/L (ADEQ, 2002d).

On March 12, 2002, ADEQ notified Simon New Mexico's legal counsel that it intended to reissue the consent order (ADEQ, 2002b). On May 21, 2002, Simon New Mexico's legal counsel in Phoenix informed ADEQ that the company had not conducted any business since 1994; was not in good standing in New Mexico, its state of incorporation; and had no other assets except the facility property. Simon New Mexico's legal counsel offered to turn over proceeds from the sale of the property to ADEQ if the department would issue the buyer a prospective purchaser agreement and agree not to sue Simon New Mexico for any environmental contamination that may exist on or under the property (Quarles & Brady Streich Lang, 2002).

On October 21, 2002, the ADEQ RCRA Unit referred the facility to the ADEQ Superfund Section (ADEQ, 2002e). ADEQ conducted a preliminary investigation and placed the Site on the WQARF Registry in June 2004. The site's Eligibility & Evaluation Score was 33 out of a possible 120.

1.4 Remedial Investigation Objectives

The objectives of the remedial investigation are to assess the following:

1. Sources of the groundwater contamination;
2. Physical characteristics of the Site, including the geology, surface water hydrology, and hydrogeology;
3. Nature and extent of contamination in the groundwater;
4. Fate and transport of the contaminants in the groundwater; and
5. Potential risk to public health from exposure to contaminants identified in the study area.

2. PHYSICAL SETTING

2.1 Topography

The Site is located within the Basin and Range physiographic province, which is characterized by north-northwest trending mountain ranges separated by low-lying sedimentary basins. The basins were later filled with weathered and eroded alluvial materials originating from the mountains. Based on surveyed elevations of borings and monitor wells at the Site, the topography of the Site is relatively flat with a slight slope to the west and elevations ranging from approximately 1220 ft above mean sea level (amsl) in the western part to approximately 1225 ft amsl at the eastern parts. The former Unichem facility is relatively flat at an elevation of about 1224 to 1225 ft amsl.

2.2 Geology

The Basin and Range physiography described above formed during a period of mostly high-angle block faulting beginning about 15 million years ago. The crystalline and extrusive rocks that form the mountains bordering the eastern Salt River Valley basin, where the Site is located, predate the period of faulting, as does the lowest basin-fill deposit, the red unit. The rocks in the eastern part of the Salt River Valley basin are divided into six units: the crystalline and extrusive rock units underlie the basin and are overlain by basin-fill deposits of the red, lower, middle and upper alluvial units (Laney & Hahn 1986).

The crystalline rocks consist of Late Cretaceous to early Tertiary granitic rocks and Precambrian schist, gneiss, granite, and quartzite. The extrusive rocks are dominated by middle to late Tertiary rhyolitic to basaltic pyroclastic and flow rocks. The red unit is comprised of reddish, well-cemented breccia, conglomerate, sandstone, and siltstone. The clastic rocks are poorly sorted, with ill-defined bedding, while the siltstone and sandstone are more clearly stratified and sorted. Some mafic to felsic volcanic-flow and pyroclastic rocks are interbedded with the sedimentary rocks near the upper margin of the red unit (Laney and Hahn, 1986).

Overlying the red unit is the lower unit, which makes up the largest volume of sedimentary deposits in the Salt River Valley basin. The lower unit can be divided into lower and upper sections, and may be as much as 10,000 ft thick in the central part of the basin. The lower and older portion consists of mudstone, anhydrite, conglomerate, and basalt. The upper, younger portion is comprised of clay, silt, mudstone, sand, gravel, and conglomerate. Deposits in the lower unit are generally poorly sorted, and derived from the mountains surrounding the basins. As much as 600 ft of the lower unit is saturated (Laney and Hahn, 1986).

The middle unit consists mostly of silt, siltstone, and silty sand and gravel that is as much as 1,000 ft thick in the central part of the basin and as much as 700 ft is saturated. The Salt River drainage basin was the principal source of alluvial material for the middle unit. The upper unit underlies most of the Salt River Valley floor, and is comprised of mostly unconsolidated gravel, sand, and silt. The upper unit is as thick as 300 ft near the center of the basin, and as little as several feet thick close to the mountain fronts. Like the middle unit, the Salt River drainage provided most of the sediments incorporated into the upper unit (Laney and Hahn, 1986).

2.3 Hydrogeology

The Site is located within the East Salt River Valley Sub-basin of the Phoenix Active Management Area. The valley is drained by the Salt and Agua Fria Rivers, both tributaries of the Gila River. The crystalline and extrusive rock units that underlie the basin form virtually impermeable hydrologic boundaries (Corkhill et al, 1993). Locally, the bedrock unit may contain groundwater where it is fractured but yield is usually poor. The bedrock unit has not been encountered in borings registered with the Arizona Department of Water Resources (ADWR) within approximately one mile radius of the Site. Principal aquifer material within the sub-basin is the alluvial basin-fill deposits.

The red unit has been observed to be hydraulically productive near Scottsdale, but hydraulic conductivities associated with this unit are generally unknown. However, as with the crystalline and extrusive bedrock, fractures and faults in the red unit may allow wells to yield as much as 1 gallon per minute (gpm). In general, the lower unit is more productive near the mountains where sand, gravel, and conglomerate predominate, and less productive near the center of the basin, where mudstone, clay, and silt predominate. In the older portion of the lower unit, conglomerate and basalt flows may yield as much as 100 gpm, depending on fracturing, while wells completed in mudstone can yield as little as 5 gpm. The younger portion of the lower unit produces more water, 50 to 3,500 gpm depending on the material the well is completed in (Laney and Hahn, 1986).

The middle alluvial unit is the principal water-bearing unit in the basin and will yield as much as 4,000 gpm where the saturated thickness is significant, 300 to 500 ft, with gravel and sand predominant. The middle unit is mostly fine grained, however, and yields around 500 gpm when silt and clay dominate the materials penetrated and saturated thickness is 300 to 500 ft. Due to historical groundwater development, the upper alluvial unit is saturated only in a small area in the southwestern part of the basin where it may yield as much as 4,000 gpm from sands and gravels. The distribution of fine- and coarse-grained materials in the upper unit strongly affects groundwater recharge, flow, and production, with perched layers occurring occasionally due to fine-grained layers and cementation of coarser materials. The upper unit transmits recharge derived from sheet flow, flood flow in ephemeral streams, and irrigation to the water table (Laney and Hahn, 1986).

The Site is directly underlain by a fine-grained clayey interval to about 70 ft below land surface (ft bls) that overlies a coarse-grained sand and gravel sequence extending to a depth of about 270 ft bls. The elevations and thickness of the sand and gravel unit correspond reasonably well with the mapped distribution of the upper alluvial unit of Laney and Hahn (1986). The sequence of silts, clays and sands underlying the sand and gravel unit at the Site are considered to be the upper part of the middle alluvial unit and host several water supply wells. Figures 4 and 5 present lithologic cross-sections for the Site.

2.4 Climate

The climate of the area is arid with average annual precipitation for the nearest station at Mesa of 9.49 inches, based on the 1981-2010 climate normals (NCDC, 2011). Precipitation in the region is strongly influenced by the North American monsoon, characterized by a summer rainfall peak occurring from July through early September due to moist tropical air moving from the south or southeast that generates localized convective thunderstorms of high intensity and short duration. Winter precipitation is influenced by cyclonic storms that move from the west or southwest and is more widespread and generally of low intensity and long duration. Interannual variability in winter precipitation is typically related to El Niño-Southern Oscillation (ENSO) events that result from variation in sea-surface temperature of the eastern equatorial Pacific Ocean (Sheppard et al., 2002). Increased temperatures (El Niño) usually result in wet winters and decreased temperatures (La Niña) usually result in dry winters. Additionally, the Pacific Decadal Oscillation (PDO), a temporal variation in sea-surface temperatures for most of the Northern Pacific Ocean, can interact with ENSO. The effects of ENSO and PDO can amplify each other, resulting in increased interannual variability in precipitation over the Southwest (Sheppard et al., 2002).

Between 1981 and 2010, the average maximum and minimum temperatures for the nearest station at Mesa were 85.9 degrees Fahrenheit (°F) and 57.5°F, respectively (WRCC, 2011). Monthly average maximum temperatures range from 66.1 to 105.3°F and monthly average minimum temperatures range from 40.6 to 77.0°F (WRCC, 2011). Annual standardized potential evapotranspiration in the area is on the order of 1600 to 1700 millimeters (mm) (63-67 inches) (Brown, 2005).

3. REMEDIAL INVESTIGATION ACTIVITIES

This section summarizes the investigation and response action activities undertaken at the Site.

3.1 Initial Investigations

Simon Environmental Engineering, Inc. performed initial environmental investigations at the former Unichem facility in 1990 on behalf of attorneys for Unichem International, Inc. (Simon-EEI, 1990). The subsurface investigation involved the advancement of 24 soil borings across the property to depths of 80 ft bls. Groundwater was not encountered in any of the borings (Simon-EEI, 1990).

Analytical results reported total petroleum hydrocarbons (TPH) in 14 of 24 soil borings to depths of 80 ft with concentrations ranging from 10.0 mg/kg at 10 ft in SB-15 and at 45 ft in SB-16 to 560.0 mg/kg at 5 ft in SB-24. PCE was reported in 11 of 24 borings to depths of 80 ft with concentrations ranging from 0.01 mg/kg at 10 to 40 ft in 6 soil borings to 1.4 mg/kg at 10 ft in SB-21. Additionally, 1,1,1-trichloroethane was detected in 5 of 24 borings with reported concentrations ranging from 0.01 mg/kg at 65 ft in SB-15 and at 5 ft in SB-24, to 0.11 mg/kg at 75 ft in SB-22. Copper and arsenic were detected in all 24 soil borings to depths of up to 75 and 80 ft, respectively. Copper concentrations ranged from 8 mg/kg at 15 ft in SB-2 and at 75 ft in SB-17 to 297 mg/kg at 5 ft in SB-24. Arsenic concentrations ranged from 11 mg/kg at 80 ft in SB-6 to 37 mg/kg at 35 ft in SB-21 (Simon-EEI, 1990).

ADEQ has no current remediation standard for TPH in soil. The maximum reported PCE concentration from the soil borings exceeded the residential SRL of 0.51 mg/kg and minimum GPL of 0.8 mg/kg, but did not exceed the non-residential SRL of 13 mg/kg. The concentrations of 1,1,1-trichloroethane from the soil borings did not exceed either the residential SRL of 1200 mg/kg or the minimum GPL of 0.94 mg/kg. Copper concentrations from the soil borings were substantially less than both the residential SRL of 3100 mg/kg and the calculated GPL of 7415 mg/kg. Arsenic concentrations from the soil borings exceeded the residential SRL of 10 mg/kg, but not the minimum GPL of 290 mg/kg.

3.2 Site Assessment

Hydro-Search, Inc. (HSI) performed a site assessment at the former Unichem facility in 1994 on behalf of the property owner. The site assessment evaluated conditions in the immediate vicinity of the dry well (HSI, 1994) and included an exploratory soil boring and installation of three groundwater monitoring wells.

The exploratory borehole was drilled to a depth of 99 ft bls in the center of the dry well and encountered PCE concentrations in air near the boring that required Level B personnel protection measures (HSI, 1994). The dry well was found to extend to a depth of 42 ft bls and consist of a drainage chamber containing gravels and a sediment chamber formed by concrete rings extending to approximately 10 ft bls. The borehole was filled with cement grout to a depth of approximately 50 ft bls and the remainder completed as a potential vapor recovery well using a 50-ft section of 4-inch diameter polyvinyl chloride (PVC) 0.040-inch factory-slotted well screen.

Three groundwater monitoring wells (MW-101, MW-102 and MW-103) were each drilled to a depth of 165 ft bls. A summary of well completion details is included in Table 1 and well locations shown in Figure 2. The wells were developed by pumping groundwater until turbidity was decreased to a “reasonable level” (HSI, 1994).

Soil samples collected at the Site in 1994 were analyzed and determined to be contaminated with PCE at a maximum concentration of 24,000 mg/kg beneath the dry well. This concentration is above the non-residential SRL of 13 mg/kg and the GPL of 0.8 mg/kg. Groundwater sampling of the three monitoring wells in 1994 found PCE at concentrations ranging from 28 to 650 µg/L, above the MCL and AWQS for PCE of 5 µg/L. Subsequent samples collected from the monitoring wells indicated PCE at concentrations ranging from 53 to 5,800 µg/L in 1995, and 310 to 6,600 µg/L in 1996 (HSI, 1996).

3.3 Soil Assessment

Environmental Professional Services, Inc. performed a Soil Assessment for potential contamination on the former K B Diesel Services property (west portion of the former Unichem property) in 2000 and 2002. Activities associated with this assessment included soil vapor surveys with on-site volatile organic compound (VOC) vapor analysis using a mobile laboratory, soil borings with associated soil sampling, shallow soil sampling, laboratory analysis of soil samples for VOCs and metals, and lithologic logging (EPS, 2000; 2002).

The results of the soil vapor survey indicated the highest concentrations of PCE in soil vapor were located near the eastern boundary of K B Diesel Services property. PCE was detected at every location where soil vapor probes were installed.

In general, soil borings showed a surface layer of 1-2 inches of gravel overlying clayey sand extending to 8 ft bls, the total depth of soil borings during Soil Assessment activities. Two of the soil borings showed 2-4 inch thick layers of clayey sand containing scattered green granules less than 1/8 inch in diameter, presumably of copper sulfate, between about 8 and 12 inches bls (EPS, 2000; 2002).

While total arsenic levels in soil samples were measured below the laboratory reporting limit of 5 mg/kg, total copper was measured at 6,200 mg/kg in one of the soil borings with presumed copper sulfate granules. The ADEQ SRL for copper is 3,100 mg/kg for residential properties and 41,000 mg/kg for commercial properties. VOCs were detected in soil sample laboratory results above the reporting level but below ADEQ SRLs. PCE soil concentrations ranged from 0.47 to 1.4 mg/kg, and bromomethane soil concentrations ranged from 0.41 to 0.58 mg/kg. 1,1,1-TCA was also detected at a concentration of 0.32 mg/kg (EPS, 2000; 2002).

3.4 ADEQ Investigations

The site assessment activities indicated release of PCE and TCE to the vadose zone in the vicinity of the dry well on the former Unichem facility and impacts to groundwater below the facility. The monitoring wells were not sampled from 1997 through 2001. In January 2002, groundwater samples collected by ADEQ from MW-102 and MW-103 indicated a maximum PCE concentration of 1,300 µg/L. Monitoring well MW-101 had been damaged in the intervening period and was inaccessible for sample collection or water level measurements (ADEQ, 2004). The damaged casing in MW-101 was repaired in 2006.

ADEQ subsequently installed two additional monitoring wells, designated as MW-104S and MW-104D, in 2003 to investigate groundwater impacts in the vicinity of TOG well G-9 northwest of the former Unichem facility. Well locations are shown on Figure 2. Well MW-104S is a shallow well screened from 115 to 165 ft bls, and MW-104D is a deeper well screened from 580 to 610 ft bls. The screened interval of MW-104D is within the upper portion of the productive interval of TOG #15 which produces from an interval of 570 to 950 ft bls. In August 2003, PCE and TCE were detected in MW-104S at 16 and 6 µg/L, respectively. Between September 2003 and January 2014 PCE concentrations in samples from MW-104S ranged from 5.1 µg/L to 34 µg/L (Terranext, 2005; HGC, 2014). PCE has only been detected in well MW-104D during the September 2005 sampling event and during the third quarter 2006 sampling event. Both detections were below the AWQS, ranging from 0.44 to 0.59 µg/L (HGC, 2005d and 2006e).

In 2005, ADEQ initiated an ERA investigation to further define soil and groundwater contamination associated with the Site. HGC was contracted by ADEQ to undertake the ERA investigation and to collect data to characterize the source area of contamination below the former Unichem facility. The focus of the field investigation was on collecting soil, soil vapor, soil physical properties, and groundwater data necessary to: 1) determine the feasibility of soil vapor extraction (SVE) and air sparging (AS), and 2) evaluate the possibility of extracting highly contaminated groundwater at the former Unichem facility for groundwater treatment.

3.4.1 Monitor Well Installation

Additional groundwater monitoring wells, MW-105 through MW-112, were installed in 2006 through 2008 to further define the magnitude and extent of PCE contamination in groundwater and determine groundwater flow direction. MW-105 through MW-109 also allowed assessment of the extent of the capture zone created by the extraction well during active remediation. Details are presented in the monitoring well installation reports (HGC, 2006f; 2007c; 2008g).

HGC also installed additional monitoring wells in 2011 and 2013, in an effort to complete the delineation of the PCE contamination in groundwater. Details of these well installations are presented in Appendix A; well development and survey data are presented in Appendix B; investigation-derived waste (IDW) information is presented in Appendix C. Monitoring wells MW-113 and MW-114 were installed in 2011 in order to define the extent of the PCE solute plume to the north and northwest. Monitoring wells MW-115, MW-116, MW-117, MW-118, MW-119S and MW-119D were installed in 2013. The deeper well, MW-119D, was installed in a similar interval and design as monitoring well MW-104D, to evaluate the PCE contamination previously identified in SRP Well 29E-1.0S.

Locations for the monitoring wells are shown on Figure 2. Lithologic logs and as-built well construction diagrams are provided in Appendix D. Table 1 contains a summary of well completion details.

3.4.2 Soil and Soil Vapor

Fifteen shallow subsurface and five deep soil borings were advanced in March and April 2006 to collect subsurface information and facilitate design of the air sparging/soil vapor extraction (AS/SVE) and groundwater extraction systems. The soil boring locations are shown on Figure 6 and boring logs for the deep borings are included in Appendix E. Drilling and sampling of the boreholes was conducted in accordance with the methods and procedures described in the Work Plan (HGC, 2005a). Soil samples were collected for lithologic characterization and analysis for VOCs, metals, and cyanide (CN).

The fifteen shallow borings (SS-1 through SS-15) were advanced to a depth of 10 ft bls and soil was sampled at 1-, 5-, and 10-ft depths. Soil vapor was sampled at 1-, 5-, and 10-ft depths in SS-2, SS-4, SS-7, and SS-8, and at 5- and 10-ft depths in the remaining locations (HGC, 2006b).

Soil and/or soil vapor were sampled in the deeper soil borings at 10-ft intervals to a depth of approximately 70 ft bls where cobbles were encountered that prevented advancement of the sampler; the remaining portions of the borings were advanced without collecting samples.

Nested vapor probes VP-101 through VP-103 were installed in three of the borings with screened intervals at 12.5-17.5, 40-45, and 107-112 ft bls (HGC, 2006b). AS/SVE wells were installed in the remaining borings.

HGC installed SVE-105 in in the area of a suspected surface spill in November 2010. Soil samples were collected at depths of five ft bls and at 10-ft intervals from 10 to 50 ft bls.

HGC installed three exploratory soil borings (B-1W, B-2ESE, B-3NE) in the area around SVE-104 (Figure 6) in June and July 2012 (HGC, 2013a). Soil and/or soil vapor were sampled at 10-ft intervals to a depth of approximately 70 ft bls.

Soil vapor samples were collected at a depth of 10 ft bls during the drilling of monitoring wells MW-108 and MW-109 (HGC, 2007c) and monitoring wells MW-115, MW-116 and MW-117 (Appendix A).

3.4.2.1 Soil Analytical Results

Table 2 summarizes soil analytical results from borings at the former Unichem facility. TCE, *cis*-DCE and *trans*-DCE were not detected in any soil samples (HGC, 2006b; 2013a).

PCE concentrations were low in the shallow soil borings advanced in March and April 2006, with the notable exception of the sample collected in SS-13 at 10 ft bls (91 mg/kg) and the samples collected in SS-15 at 5 and 10 ft bls (300 and 1,900 mg/kg, respectively). Of the 46 samples from the shallow soil borings analyzed for PCE, five exceeded the residential SRL of 0.51 mg/kg and three exceeded the nonresidential SRL of 13 mg/kg.

PCE was detected at concentrations ranging from 0.116 to 4.78 mg/kg in samples collected from the boring for SVE-105 at depths of 20 to 50 ft bls and was not detected in shallower samples from this boring. The highest PCE concentrations of 3.76 and 4.78 mg/kg were from samples at 30 and 40 ft bls, respectively.

PCE was detected at concentrations ranging from 0.11 to 3,900 mg/kg in samples taken from the deep soil borings installed in June and July 2012. Of the 43 samples collected from the deep soil borings analyzed for PCE, ten exceeded the residential SRL and two exceeded the nonresidential SRL. The highest PCE concentrations were from samples in B-1W at 60 and 70 ft bls (170 and 3,900 mg/kg, respectively). The maximum PCE concentrations in the soil samples correspond with the locations of the highest PCE concentration in the soil vapor samples. Non-chlorinated constituents were detected only in the soil sample from B-1W at 70 ft bls and consisted of naphthalene at 0.34 mg/kg and 1,2,4-trimethylbenzene at 0.18 mg/kg.

No metals were reported at concentrations equaling or exceeding the residential SRLs other than arsenic in two samples, from the borings for AS/SVE-102 and VP-102, and beryllium and copper in one sample from boring B-1W (Table 2). Additionally, no reported metal concentrations exceeded the GPLs other than copper in one sample (Table 2). Metals that were detected in all, or most, of the soil samples included chromium, copper, nickel, and zinc. Copper was detected at high concentrations (190, 240, 110 mg/kg) in SS-15 at 1, 5, and 10 ft bls, respectively. Elevated copper concentrations were also detected at 1 ft bls in SS-2 (140 mg/kg) and SS-13 (110 mg/kg). The highest copper concentration (15,000 mg/kg) was reported in B-1W at a depth of 30 ft bls that exceeded the residential SRL of 3,100 mg/kg and calculated GPL of 7.615 mg/kg. All other copper concentrations in the soil samples ranged from 8.4 mg/kg to 22 mg/kg.

Antimony, arsenic, beryllium and lead were infrequently detected. Arsenic was detected in 15 out of the 44 samples analyzed. Detected arsenic concentrations ranged from 5.1 mg/kg to 11 mg/kg and exhibited no spatial trends. Arsenic concentrations exceeding the residential SRL of 10 mg/kg were present in samples from AS/SVE-102 and VP-102 at a depth of 70 ft bls. Beryllium was reported only in the 30 ft bls sample from B-1W at a concentration of 1.4 mg/kg that equaled the residential SRL.

The 15,000 mg/kg concentration of copper reported from soil boring B-1W at a depth of 30 ft bls is anomalous in comparison to other copper concentrations reported from the former Unichem facility. B-1W is located adjacent to the former drywell on the property and the high copper concentration may indicate disposal of copper-bearing solution to the drywell.

3.4.2.2 Soil Vapor Analytical Results

Both PCE and TCE were detected in soil vapor samples from the former Unichem facility with PCE the more widespread of the two compounds. Neither *cis*-DCE nor *trans*-DCE was detected in any of the soil vapor samples where it was analyzed (HGC, 2006b).

Figure 7 shows PCE results with depth in each well or boring location at the facility for the 2006 sampling event. Table 3 summarizes PCE results in soil vapor samples taken at each of the shallow soil borings. PCE was detected in all the SS boring locations except SS-7. The highest PCE soil vapor concentration detected in samples from the shallow borings (which was also the highest PCE concentration detected in all borings) was 29,000 milligrams per cubic meter (mg/m^3), in SS-15 at 10 ft bls. PCE concentrations in samples from SS-12 were also relatively elevated at 2,500 to 3,300 mg/m^3. SS-12 and SS-15 are located east of the concrete pad where processing plant machinery was reportedly present. These high detections in the shallow borings are spatially consistent with the high PCE concentration detected in nearby VP-103. PCE concentrations in the other shallow borings were much lower, ranging from <1.0 to 380 mg/m^3

(HGC, 2006b). PCE concentrations in shallow soil vapor generally exceeded the U.S. EPA regional screening level (RSL) for inhalation exposure by workers of 0.047 mg/m^3 (EPA, 2013) by several orders of magnitude. Additionally, the concentrations generally exceeded a screening level for vapor migration to indoor air of 1.6 mg/m^3 calculated by dividing the RSL by an attenuation factor of 0.03.

Table 4 summarizes PCE concentrations in soil vapor samples at each deep boring during the 2006 sampling event. PCE was detected in all samples collected in deep soil borings VP and AS/SVE wells and concentrations generally increase with depth. TCE was only detected in samples from VP-102 at 60 and 70 ft bls where detected concentrations were 14 and 11 mg/m^3, respectively. The highest PCE soil vapor concentration detected in the deep soil borings was at 14,000 mg/m^3 in VP-103 at 60 ft bls. A relatively high PCE concentration of 7,400 mg/m^3 occurred in AS/SVE-102 also at 60 ft bls. AS/SVE-101 had the lowest PCE concentrations of the deep borings, which ranged from 66 to 170 mg/m^3, with concentrations being relatively uniform with depth. During sampling of AS/SVE-101 the vacuum pump used for purging was malfunctioning. Consequently the low PCE results for AS/SVE-101 may not accurately reflect the soil vapor concentrations at this location. The deep soil vapor results indicate that the major contamination is in the southern portion of the Site (HGC, 2006b).

Subsequent soil vapor results from the deep soil borings B-1W, B-2ESE, and B-3NE conducted in June 2012 near SVE-104 are summarized in Table 4. PCE was detected in all three borings, while TCE was detected only in B-1W. Soil vapor samples were collected from B-1W at 10-foot intervals from 10 to 70 ft bls. PCE soil vapor concentrations vary between 0.017 and 0.685 mg/m^3 from 10 to 50 ft bls and increased to 237 and 2,370 mg/m^3 at 60 and 70 ft bls, respectively. Due to high soil vapor PCE at depth, dilutions were necessary during laboratory analysis, resulting in decreased sensitivity in TCE analysis. As a result, TCE concentrations were sometimes above detection limits at 0.0134 to 0.0392 mg/m^3 from 10 ft bls to 50 ft bls, but less than the detection limits of 5.37 and 13.4 mg/m^3 at 60 and 70 ft bls, respectively.

In boring B-2ESE, samples were collected at 10-foot intervals from 10 ft bls to 70 ft bls and at 74.4 ft bls. Soil vapor PCE concentrations in samples from B-2ESE were highest near the surface at 9.49 mg/m^3 at 10 ft bls and 2.17 mg/m^3 at 20 ft bls. These concentrations exceeded the RSL of 0.047 mg/m^3 and soil vapor screening level of 1.6 mg/m^3. Below 20 ft bls, soil vapor PCE concentrations in B-2ESE varied from 0.136 mg/m^3 to below detection limits (<0.00678 mg/m^3). Deep boring B-3NE was sampled at 10-foot intervals from 10 ft bls to 70 ft bls and at 74.5 ft bls. Soil vapor PCE concentrations were lower in B-3NE than in B-1W and B-2ESE, with the sample from 10 ft bls showing the highest level at 0.176 mg/m^3 that exceeded the RSL of 0.047 mg/m^3, but not the soil vapor screening level of 1.6 mg/m^3. Deeper samples showed soil vapor PCE concentrations ranged from 0.0814 mg/m^3 to below detection limits (<0.017 mg/m^3; Table 4).

Soil vapor results from samples collected at 10 ft bls during the installation of monitoring wells MW-108 and MW-109 did not indicate the presence of any reportable chlorinated VOCs at concentrations above their respective laboratory reporting limits (HGC, 2006b). However, the petroleum hydrocarbon constituents benzene and toluene were identified above their reporting limits. Benzene concentrations in MW-108 and MW-109 were 0.0039 mg/m^3 and 0.0047 mg/m^3, respectively. Toluene concentrations in MW-108 and MW-109 were 0.0056 mg/m^3 and 0.018 mg/m^3, respectively.

Soil vapor results from samples collected at 10 ft bls during the installation of monitoring wells MW-115, MW-116 and MW-117 indicated the presence of PCE in MW-117 at 0.0727 mg/m^3 that exceeded the nonresidential RSL of 0.047 mg/m^3, but not a nonresidential soil vapor screening level of 1.6 mg/m^3. No other chlorinated COCs were identified in any of the soil vapor samples. Various other minor reportable VOC constituents were identified in all of the samples, however, including petroleum hydrocarbon constituents 1,2,4-trimethylbenzene (ranging from 0.00649-0.119 mg/m^3) and toluene (ranging from 0.0164-0.226 mg/m^3). Ethylbenzene was identified in samples from MW-115 and MW-116, at 0.00781 and 0.0367 mg/m^3, respectively, and xylenes (total) at 0.0104 and 0.2642 mg/m^3, respectively; and benzene and 1,3,5-trimethylbenzene were identified in MW-116 at 0.0129 mg/m^3 and 0.0263 mg/m^3, respectively.

3.4.3 Groundwater Monitoring

HGC collected water level measurements and groundwater samples from Site wells from 2005 through July 2014. Water level measurements have been collected on a monthly basis. After the initial sampling in 2003, groundwater sampling was conducted on a quarterly basis from 2005 through January 2009. Procedures and results for these groundwater monitoring events conducted by HGC are detailed in groundwater monitoring reports (HGC, 2005c; 2005d; 2005e; 2006c; 2006d; 2006e; 2007a; 2007b; 2008a; 2008b; 2008c; 2008d; 2008e; 2009). After a hiatus in 2009 due to funding constraints, groundwater sampling was conducted on a quarterly basis since the second quarter 2010 (2Q2010). At ADEQ's request, no formal groundwater monitoring reports were prepared for these events, but figures and data tables were submitted periodically from 2Q2010 through 3Q2014.

Depth-specific samples were collected in MW-102 and EW-101 to assess PCE stratification and provide information for deciding the depth to complete extraction well EW-101 (HGC, 2006b). From April 2012 through July 2014, depth-specific sampling was conducted in MW-102 using passive diffusion bag (PDB) samplers, with samples collected from roughly 100, 120, 140 and

155 ft bls. Depth-specific samples from PDB samplers were also collected from MW-101 and MW-103 in July 2013.

3.4.3.1 Depth to Water

Historical groundwater elevation data for wells associated with the Site are summarized in Table 5. Monthly water level hydrographs showing groundwater elevations since HGC began conducting groundwater monitoring are included in Appendix F. The hydrographs show a generally increasing trend in water level elevation over time. Overall, the shallow wells display a relatively consistent pattern of behavior.

Figure 8 provides hydrographs of MW-104S and MW-104D that contrast the behavior of water levels in the shallow and deep aquifers. Water elevations in the shallow well (MW-104S) are fairly consistent throughout the year with no significant short-term fluctuations. There was an approximately 6-foot decrease from February 2007 to June 2007. The groundwater elevation subsequently has increased approximately 30 ft from June 2007 until March 2012 and then shows a decreasing trend of a few ft. In contrast, MW-104D exhibits wide range of water level changes; the water elevation is typically depressed during the summer months and starts to recover during the August/September timeframe, likely reflecting seasonal pumping of the deeper aquifer. The data indicate a strong downward gradient. The clay aquitard, in this specific location, appears to be a partial barrier to groundwater flow as inferred from the gradual decline of the shallow aquifer water levels in MW-104S compared to the rapid decline of the water levels in MW-104D since August 2011. The broad patterns of water level fluctuations are consistent with hydraulic communication between the shallow and deep aquifers that is limited by the expected low average hydraulic conductivity of the clay aquitard.

Hydrographs for the on-site shallow wells are presented in Figure 9. Water levels dropped approximately 10-ft between 2002 and the first quarter measurements collected in 2005, and have gradually increased until February 2007. During the 2Q2007, water levels declined approximately 6 ft. Water levels were observed to begin increasing during the 3Q2007 and the increase continued through the 1Q2012 with a total change of approximately 26 ft. Water levels subsequently have decreased approximately 5 ft. Historical data are also available for TOG well G-9, which is less than 500 ft from the well nest at MW-104. Figure 10 provides the monthly water level elevations for this well since TOG began monitoring in January 2001. Since the monitoring began, a trend of decreasing water elevation had been apparent in this well with annual fluctuations of 5 to 10 ft. Elevations are typically lowest during the July through August timeframe and show recovery during the late fall and winter months. However, since the start of 2005, water levels have risen approximately 40 ft. Water elevations from February 2007 to June

2007 showed a decrease in elevation of approximately 6 ft that is consistent with the same decrease noted in the other shallow aquifer wells. Superimposed on Figure 10 are the water level measurements for G-10 which closely follow G-9 measurements.

Hydrographs for the off-site shallow wells are presented in Figure 11. These wells follow a pattern similar to the on-site wells and the TOG wells. Monitoring wells MW-105 and MW-106 show a similar increasing trend from installation in mid to late 2006 through January 2007. The water elevations then decrease by approximately 6 ft from February 2007 through June 2007. The water level in monitoring wells MW-105, MW-106, MW-107, MW-108, and MW-109 increased approximately 26 to 27 ft between June 2007 and March 2012. Water levels subsequently have decreased approximately 5 ft. Monitoring wells MW-110 through MW-114 show the same pattern since installation.

3.4.3.2 Flow and Gradient

A groundwater elevation map for April 2015 is provided in Figure 12. Horizontal groundwater flow on average is currently to the northwest and the hydraulic gradient is on the order of 0.0005 ft/ft. Groundwater elevation maps prepared by HGC for the period January 2011 through September 2014 and groundwater elevation maps prepared by Geosyntec Consultants for the period 4Q2014 through 1Q2015 are included in Appendix G. Groundwater flow direction has varied from northwest to west and southwest. The hydraulic gradient has ranged from approximately 0.0003 to 0.001 ft/ft.

3.4.3.3 Groundwater Quality

Historic data from HGC's groundwater sampling for VOCs, total metals and cyanide, and major ions are provided in Tables 6, 7 and 8, respectively. PCE, TCE and arsenic have exceeded AWQSs in at least one monitoring well. PCE has been detected above laboratory reporting limits and above the AWQS in 19 of 26 monitoring wells and EW-101 (Table 6). PCE has not been reported in samples from MW-112, MW-118, or G-2; PCE has been reported, but below the AWQS in, MW-113, G-7, and G-8 (Table 6).

PCE and toluene have been reported in samples from the deep aquifer wells MW-104D and MW-119D (Table 6). Concentrations of PCE in MW-104D generally have been below the reporting limit and the two reported concentrations of 0.59 µg/L and 0.44 µg/L were below the AWQS of 5 µg/L. Toluene is the only VOC consistently detected in MW-104D (Table 6). Toluene concentrations exhibited a generally increasing trend with a high degree of variability between installation in July 2003 and October 2010, when the high concentration of 54.8 µg/L was reported. Subsequent toluene results for MW-104D have been relatively low, ranging from below detection to 10 µg/L. Toluene in MW-104D has never exceeded the AWQS of 1,000 µg/L. Concentrations of PCE in MW-119D have been reported at concentrations ranging from 4.9 µg/L to 7.3 µg/L, both above and below the AWQS of 5 µg/L. Toluene concentrations in MW-119D are below the AQWS. Additionally, chloroform has been reported from MW-119D at concentrations ranging from 5.4 µg/L to a maximum concentration of 320 µg/L that exceeded the AWQS of 100 µg/L.

Table 9 contains the historic PCE and TCE concentrations for on-site wells MW-101 through MW-103 and EW-101. Data for MW-101 were unavailable from January 2002 through April 2006, as the well casing was damaged. This well was repaired and measurements commenced in May 2006. EW-101 was installed in March 2006. The historic PCE concentrations at these wells are plotted on Figure 13. Concentrations of PCE decreased significantly between the January 2002 sampling event and HGC's initial sampling in 2005. PCE levels increased in Site monitoring wells from the 3Q2005 to 1Q2007 but have generally decreased since then. However, PCE concentrations in MW-101 through MW-103 commonly show order of magnitude fluctuations. No TCE has been reported above the AWQS in the on-site monitoring wells.

Table 10 contains the historic PCE and TCE concentrations for off-site wells MW-104S through MW-119S and TOG irrigation supply wells G-9 and G-10. The historic PCE analytical results are plotted on Figures 14 and 15. PCE has been detected above the AWQS in all off-site monitoring wells except MW-112, MW-113, and MW-118. PCE has been consistently above the AWQS in G-9, G-10, MW-104S, MW-105, MW-106, MW-109, MW-110, and MW-114, with concentrations fluctuating by approximately 30 µg/L. PCE concentrations in MW-107, MW-108, and MW-111 have been somewhat lower, peaking at 9.1, 15, and 24 µg/L, respectively, and showing a decreasing trend since 4Q2011. PCE was below AWQS in MW-111 in April 2014, and has been consistently below the AWQS in MW-107 since 2Q2011. Monitoring wells MW-115, MW-116, MW-117, MW-118, and MW-119S were installed in 2013. PCE has been detected above the AWQS in MW-115, MW-116, MW-117, and MW-119S, but has not been detected in MW-118.

Since monitoring began in 2Q2006, PCE concentrations in MW-105 show an overall decline, from more than 100 µg/L to less than the AWQS. A similar decline has been observed in PCE concentrations in G-10, which fluctuated between 1.6 µg/L and 200 µg/L from 1Q2005 through 1Q2011, but has since decreased to less than 5 µg/L since 2Q2013 likely due to a change in groundwater flow direction

TCE has consistently been reported in MW-106 at concentrations above the AWQS, but was below AWQS for the first time in January 2014 (2.8 µg/L). TCE was reported at concentrations above the AWQS at MW-104S in the past, but has been below the AWQS since the 1Q2007 (Figure 16). TCE also has been reported above the AWQS in G-9 and G-10. TCE has been reported at concentrations below AWQS in off-site monitoring wells MW-105, MW-108, MW-109, MW-110, MW-114, MW-115, MW-116, and MW-117. TCE has not been detected above the reporting limit in off-site monitoring wells MW-107, MW-111, MW-112, MW-113, MW-118, MW-119S, MW-119D, G-2, G-7, and G-8.

Figure 16 provides concentration time series plots of PCE and TCE for MW-104S and G-9. PCE concentrations in both wells show a broadly similar pattern of increase that has generally stabilized since the 4Q2008; MW-104S shows more fluctuations in recent monitoring rounds. TCE concentrations were above the AWQS from 3Q2005 to 1Q2007 in G-9 and have been below the AWQS since the 1Q2007. TCE concentrations in MW-104S have been consistently at or below the AWQS.

MW-106, the off-site monitoring well closest to the Site on the west, is the only well with both PCE and TCE above AWQS since it was installed in September 2006 (HGC, 2006f). Figure 17 shows that PCE concentrations generally increased from 19 µg/L in March 2007 to 120 µg/L in June 2008 and then decreased to 37 µg/L over the following two quarters. PCE concentrations subsequently fluctuated between 20 to 40 µg/L from the 3Q2010 through 4Q2012 (MW-106 was not sampled between 4Q2008 and 3Q2010), increasing to 59 µg/L in July 2013 before declining to 28 µg/L in January 2014 and 19 µg/L in April 2014. PCE concentrations were reported below the AWQS in December 2014 (4.8 µg/L) and February 2015 (3.7 µg/L) (Geosyntec, 2015a; 2015b). TCE concentrations peaked at 40 µg/L in September 2007, and declined below 20 µg/L by the 4Q2008. MW-106 TCE concentrations remained relatively stable at approximately 10 to 15 µg/L until the 4Q2013, when a decrease to 6.7 µg/L occurred in October. In January 2014, TCE in MW-106 was detected at 2.8 µg/L, the first time TCE concentration has been below AWQS since monitoring began.

TOG Well G-9 was sampled on a monthly basis from 2001 until mid-2005. Prior to March 2005, all samples were collected and analyzed by TOG. Figure 15 shows a historic cyclic pattern of increasing and decreasing PCE concentrations through mid-2005. Typically, the highest concentrations occurred between July and October, while the lowest concentrations occur between December and April. The highest recorded concentration of PCE (90 µg/L) occurred in September 2002. Since the 4Q2005, PCE has shown an increase to levels consistently above the AWQS. The quarterly sampling has not shown the seasonal fluctuations noted previously. Due to changes in groundwater flow direction since monitoring began in 2005, concentrations in well G-10 have fluctuated considerably, increasing from below AWQS in 2Q2005 to 200 µg/L in 3Q2007 before decreasing below AWQS by 2Q2008. From 2Q2008 to 4Q2011, PCE concentration increased to approximately 150 µg/L in G-10, but has since declined steadily to levels below AWQS (Figure 15). TOG Wells G-7 and G-8 show occasional PCE concentrations just above the method detection limit, but not above AWQS (Table 6).

Figure 18 shows PCE concentration contours for the April 2015 groundwater monitoring event and PCE concentration contour maps prepared by Geosyntec Consultants for the 4Q2014 and 1Q2015 are included in Appendix H. Since the PCE concentrations in MW-108 and MW-109 (estimated downgradient wells) were above the AWQS, the western edge of the solute plume has also not been defined. PCE concentrations in MW-113 were below the AWQS indicating the solute plume and WQARF boundary can be considered defined to the northwest. Solute plume definition to the north and northeast is uncertain, however the most recent monitoring results from MW-114 were slightly below or exceed the AWQS.

The composite depth-specific sampling profile from MW-102 and EW-101 indicated that the highest PCE concentrations were present at depths of 152 to 160 ft bls. and that PCE was not detected below 180 ft bls (HGC, 2006b). PCE was reported at concentrations of 120, 540 and 49 µg/L at 136, 152, and 160 ft bls, respectively in MW-102 and 470, 150 and 180 µg/L at 160, 170 and 180 ft bls, respectively, in EW-101. No TCE or 1,2-DCE was detected in either well at any depth.

Eight depth-specific sampling events have been conducted in MW-102 since April 2012 that generally indicate higher PCE concentrations at shallower depths (Table 6). Depth-specific samples from MW-101 and MW-103 in July 2013 showed PCE concentrations above the AWQS of 5 µg/L in MW-101 at 122 ft bls (7.6 µg/L) and 141-143 ft bls (11 µg/L) and samples from MW-103 showed detectable levels of PCE (1.3-1.4 µg/L) below the AWQS. TCE was not detected in depth-specific samples from MW-101 and MW-103, and has not been detected in depth-specific samples from MW-102 in 2013 or 2014. Low levels of chloroform (up to 2.1 µg/L) have frequently been measured in depth-specific samples from MW-101, MW-102 and MW-103.

Since monitoring began, total arsenic has been detected above laboratory reporting limits in all 25 monitoring wells in which it has been measured and in EW-101. Arsenic has not been measured in G-2. In all wells in which it has been measured, arsenic concentrations generally have been at or above the 10 µg/L AWQS (Table 7). Arsenic concentrations in many of the shallow wells fluctuate above and below the AWQS. Arsenic concentrations in G-7, G-8, G-9 and G-10 tend to be greater than in the other shallow wells (including those located close to them) and have been consistently above 20 µg/L and as high as 110 µg/L (Table 7). The higher arsenic concentrations detected in G-7, G-8, G-9, and G-10 may be related to the greater depth of these wells (completed to 250 ft bls) compared to 150 to 165 ft bls for the other shallow monitoring wells. The formation may contain greater proportions of arsenic-bearing minerals at greater depths. Although arsenic has exceeded the AWQS of 10 µg/L in all but four monitoring wells over the historical monitoring period, its presence is attributed to background aquifer geochemical conditions.

Other metals have been detected in Site groundwater, including antimony, cadmium, chromium, lead, selenium, mercury, silver, thallium, barium, copper, and zinc. Beryllium has not been detected in any Site monitor wells. Metals other than arsenic have exceeded their respective AWQS in only six instances, including antimony in MW-102 (March 2005), MW-104S (March 2005), MW-104D (May 2005), G-8 (March 2005), and G-9 (March 2005), and selenium in MW-105 (June 2006). There is no spatial pattern evident in the detected concentrations that would indicate a localized source. No AWQS for metals besides arsenic has been exceeded in Site monitoring wells since 2006. The most commonly detected metals besides arsenic are barium and copper (Table 7).

The major ion composition of the groundwater is relatively consistent among the monitor wells consisting primarily of sodium chloride (Table 8). Sodium and chloride concentrations typically center on 300 and 400 mg/L, respectively, and exceed the AWQS for sodium (250 mg/L) and the secondary MCL for chloride (250 mg/L). Median calcium, magnesium, and potassium concentrations are approximately 70, 30, and 5 mg/L, respectively; nitrate and sulfate are approximately 8 and 150 mg/L, respectively, and nitrate has on occasion marginally exceeded the AWQS of 10 mg/L in G-9, MW-104S, and EW-101. Alkalinity in the 200 to 400 mg/L range is attributable primarily to bicarbonate (Table 8). A Piper diagram is provided in Figure 19 that illustrates the general similarity of major ion composition between groundwater samples and of groundwater with effluent from the TOG Neely Street WWTP.

3.5 Early Response Action

The Early Response Action (ERA) for the Site included the installation and operation of an AS/SVE system and a groundwater extraction system. The AS/SVE system was intended to address PCE contamination in the vadose zone and groundwater at the former Unichem facility. The groundwater extraction system was intended to effect capture of the PCE solute plume in the source area.

3.5.1 Air Sparge/Soil Vapor Extraction System

The wells for the AS/SVE system (AS/SVE-101 and -102) were installed to a depth of 150 ft. The AS and SVE components of each well were completed within the same borehole. The 2.5-

inch AS portion of the well was screened from 145 to 150 ft bls. The 4-inch SVE portion of the well was screened from 40 to 110 ft bls.

HGC conducted pilot testing of the SVE system during August 2007 (HGC, 2008f). Results of the baro-pneumatic and SVE tests indicated an average effective air porosity of 0.16, which was considered representative of both the deeper, coarse material at the Site and the wetter, finer-grained, overlying materials. The estimated average vertical air permeability of the vadose zone was approximately 10 darcies. Estimated horizontal air permeabilities varied from approximately 30 to 136 darcies based on observation well data collected from the test at SVE-102, and from approximately 25 to 125 darcies based on observation well data collected from the test at SVE-101.

The final design documentation for the AS/SVE system is included in the Operations & Maintenance (O&M) Manual (HGC, 2011b). The AS/SVE system consisted of the two AS/SVE wells, an ADEQ-owned packaged SVE system and an air injection system for sparging. The extracted soil vapor passes through two beds of granular activated carbon (GAC), aligned in series, each containing 2,000 lbs of carbon, to remove VOCs. The AS/SVE system layout is shown on Figure 20.

3.5.1.1 SVE Well Addition

SVE-105 was installed by HGC in November 2010. SVE-105 was installed in the area of a suspected surface spill, discovered during the ERA evaluation sampling conducted in 2006 (HGC, 2006b). SVE-105 was constructed with a screened interval from 5 to 50 ft in a borehole drilled to depth of 50.5 ft bls.

Two additional SVE wells, SVE-106 and SVE-107, were installed in exploratory soil borings in June and July 2012 HGC (2013a). SVE-106 was installed approximately five ft southwest of SVE-104 and SVE-107 was installed approximately 10 ft northeast of SVE-104 (Figure 20). SVE-106 was completed at 60.3 ft bls with a screened interval from 50 to 60 ft bls. SVE-107 was completed at 65.3 ft bls and screened from 60 to 65 ft bls. Construction diagrams for SVE-106 and SVE-107 are included in Appendix E. Pilot tests conducted for SVE-106 and SVE-107, resulted in SVE-106 being connected to the SVE system; SVE-107 was not connected and was initially used as a vent well (HGC, 2013a). In August 2013, SVE-107 was converted to operate as part of the SVE system (HGC, 2014).

3.5.1.2 SVE System Operation

SVE system operating performance is evaluated using extraction flow rates and pressures, VOC concentrations, dry and wet bulb temperatures. Measuring methods are described in HGC (2014). The operating data are used, along with laboratory-derived PCE/TCE concentrations within the combined vapor stream to the lead GAC canister, to calculate PCE/TCE recovery and estimates of GAC loading due to VOC adsorption.

Representative recent values for key operating parameters are an SVE rate of approximately 160 scfm, corresponding to about 230,000 standard cubic feet (scf) per day, and roughly 0.2 to 0.4 lbs of PCE recovered per day, based on laboratory data-corrected PID concentration readings of 2-5 parts per million by volume (ppmv) (HGC, 2014).

Initial start-up of the SVE system occurred on December 22, 2008. The AS/SVE system was in continuous operation from July 6, 2009 with periodic shut-downs for carbon change out, maintenance and repair. Cumulative PCE recovery through August 2014 has been approximately 4,600 pounds (lbs). Cumulative PCE recovery over time is shown in Figure 21.

The AS/SVE system was shut down on August 22, 2014 due to breakthrough conditions in the GAC canisters and the need for further operations is currently being evaluated.

3.5.2 Groundwater Pump-and-Treat System

A groundwater extraction well (EW-101) was installed and developed in March and April 2006 (HGC, 2006b). A pump test was performed in September and October 2007 (HGC, 2008f). The groundwater extraction system was started September 17, 2010 and was in operation until system shut down on September 30, 2014.The need for further operations is currently being evaluated.

3.5.2.1 Pump Tests

On September 29, 2007 HGC conducted a short-term aquifer pump test in EW-101 Methods and procedures are detailed in HGC (2008f). Pressure transducers were installed into EW-101, MW-101, MW-102, MW-103 and MW-105 to record changes in water level at 30 second intervals. The test was run at a pumping rate of 110 gpm for 250 minutes and recovery was monitored for 38 hours.

Hydraulic parameters were estimated using the pumping and water level data collected from the test. Estimates for transmissivity, storage coefficient and vertical hydraulic conductivity were performed using WHIP (HGC, 1988) and AQTESOLV (HydroSOLVE, 2000). All test data were analyzed using the "vertically anisotropic" aquifer solution available in WHIP that accounts for partial penetration of both pumping and observation wells. Pumping and recovery portions of the test were analyzed simultaneously. The tests were analyzed assuming the aquifer extended to a depth of 135 ft below the water table, or a total depth of 260 ft bls. The pumping well was partially penetrating with a screened interval of 125 to 185 ft bls. Independent estimates of hydraulic properties were calculated from data obtained at observation wells MW-101, MW-102, and MW-103 using the Theis, Neuman, and Moench solutions in AQTESOLV. Results are summarized in Table 11.

Transmissivity estimates ranged from 159,000 feet squared per day (ft^2/day) based on data collected at MW-102 to 260,000 ft^2/day based on data collected at MW-103. Estimates of storage coefficient ranged from 0.0049 at MW-102 to 0.065 at MW-103. Vertical hydraulic conductivity estimates ranged from 0.003 feet per day (ft/day) at MW-103 to 2.75 ft/day at MW-102. The range in hydraulic parameter estimates resulting from analysis of data from different observation wells indicates heterogeneity in the aquifer. Horizontal hydraulic conductivities calculated from the transmissivity estimates and the assumed aquifer thickness of 135 ft range from approximately 1190 ft/day to 1925 ft/day and average approximately 1530 ft/day. Transmissivity estimates from AQTESOLV ranged from 98,000 ft^2/day to 272,000 ft^2/day, yielding horizontal hydraulic conductivity estimates ranging from approximately 725 ft/day to 2015 ft/day. The range of estimated transmissivities and horizontal hydraulic conductivities obtained from the analyses using WHIP were within the range of estimates obtained using AQTESOLV.

An additional aquifer test was performed during the week of February 14, 2011 to refine hydraulic property estimates and determine if the estimates had changed as a result of water level increases over the intervening years. Methods and procedures are detailed in HGC (2011a). The test consisted of pumping EW-101 at a rate of approximately 110 gpm for approximately 24 hours while monitoring water levels at MW-101, MW-102, MW-103, and MW-105. Water levels were automatically logged using pressure transducers and were also periodically measured by hand.

Drawdown and pumping rate data were analyzed using the Cooper-Jacob and Neuman unconfined aquifer solutions available in AQTESOLV (HydroSOLVE, 2000). Only hand-collected water level data were quantitatively analyzed due to irregularities in the pressure transducer data. In performing the Neuman analyses, an aquifer thickness of 85 ft was used, which is the approximate depth of penetration of the pumped well into the aquifer. Flow to the well was assumed to be primarily horizontal, which is consistent with the high ratio of horizontal to vertical conductivity estimated from previous testing at the Site in 2008. Results are summarized in Table 11.

Transmissivity estimates from the Cooper-Jacob analysis ranged from 91,250 ft^2/day to 104,800 ft^2/day. Transmissivity estimates from the Neuman analysis ranged from 100,100 ft^2/day to 109,700 ft^2/day and averaged 103,300 ft^2/day. The average transmissivity from the Neuman analyses yields a hydraulic conductivity of 1,215 feet per day (ft/day) assuming an aquifer thickness of 85 ft. The indicated hydraulic conductivity value is similar to but lower than estimates made previously for the Site in 2008. The lower hydraulic conductivity estimate may result from water levels having risen into lower conductivity materials since the previous testing was performed.

3.5.2.2 Design

HGC developed a remedial process design for the removal of PCE from groundwater via existing well EW-101 (and possible future second well) using groundwater extraction and carbon adsorption treatment technologies, followed by treated groundwater discharge to the TOG sanitary sewer or SRP canal.

Groundwater extraction well EW-101 was installed to a depth of 260 ft bls. ADEQ and HGC determined that the 6-inch diameter PVC well would be completed with a screened section from 125 to 185 ft bls after review of the geophysical logs indicating a clayey layer at 185 ft bls. Appendix E and Table 1 contains a summary of well completion details. Borehole geophysical logs, including resistivity, spontaneous potential, natural gamma, neutron and caliper logs, are included as Appendix I. The pump intake was set at approximately 170 ft bls or 15 ft above the bottom of the screened interval at 125 to 185 ft bls and 20 ft above total well depth at 190 ft bls. On December 10, 2013, in an effort to maximize CVOC mass removal based on PDB sampling at discrete depth intervals indicating higher PCE concentrations at 122-124 ft bls, HGC subcontracted a licensed driller to raise the pump intake to 145 ft bls. Influent concentration over time to the treatment system is shown in Figure 22.

Groundwater was continuously extracted from the underlying aquifer via EW-101 at an average design flow rate of 150 gpm. After passing through a particulate filter, the extracted groundwater was treated for PCE removal within two liquid-phase carbon canisters, aligned in series, each containing 5,000 lbs of virgin carbon, prior to discharge to the TOG sanitary sewer or SRP canal. Approximately 20,000 lbs of carbon were estimated to be required over the duration of the corrective action, based upon an average carbon adsorption capacity of 15 lbs of PCE per 100 lbs of carbon and approximately 3,000 lbs of PCE to be adsorbed over the project life. (HGC, 2006b)

The location and general arrangement of the remediation equipment compound for the groundwater extraction and treatment system, including the AS/SVE system, are depicted on Figure 20.

3.5.2.3 Capture Zone Analysis

An analysis of the capture zone for EW-101 was performed using three primary methods: a simple mathematical calculation of boundary limits; an analysis of kriged and contoured water levels; and an analysis using a particle tracking analytical model (HGC, 2011a). The analyses were based on water levels measured in June 2010 when the hydraulic gradient was to the west. For the capture zone analysis, the pumping rate was 110 gpm and the regional hydraulic gradient used was 0.000342 ft/ft, with a transmissivity of 103,300 ft^2/day and a hydraulic conductivity of 1,215 ft/day based on a limited pumping test (HGC, 2011a). Results of the analysis are shown in Figure 23. Due to the subsequent change in groundwater flow direction to the northwest, the capture zone likely rotated and may have altered in response to changes in hydraulic gradient.

3.5.2.4 Water Treatment Plant Operation

The water treatment plant has been in operation since groundwater extraction system start-up September 17, 2010. The plant has treated a cumulative total of 193,007,341 gallons of groundwater through the end of September 2014 (Table 12). Effluent average monthly flows during operation range from 0.004 to 0.196 million gallons per day (MGD) and maximum flows range from 0.126 to 0.215 MGD.

Daily discharge rates from the system were approximately 123 gpm, with around 0.2-0.3 lbs of VOCs removed monthly by the system. Approximately 75% of VOC mass removed is comprised of PCE, with the remaining ~25% comprised of chloroform. Approximately 41 lbs of VOCs were removed by the WTP between system startup and system shut down on September 30, 2014.

4. CONCEPTUAL SITE MODEL

4.1 Site Geology and Lithology

The strata underlying the former Unichem facility generally consist of clays and silty-clays with small amounts of fine sand (5 percent or less) from the surface to approximately 70 ft bls. Interbedded elastic silt, clay, and sand were encountered from 20 to approximately 45 ft bls. Clays generally were of a reddish-brown color with high plasticity. Many of the clay samples have inclusions of caliche, and all samples from 0 to 70 ft generally had a strong reaction with hydrochloric acid (HCl).

Geotechnical properties for the clayey materials overlying the aquifer are summarized in Table 13, and laboratory results are provided in the ERA Evaluation Technical Report (HGC, 2006b). All physical tests were collected from the same borehole (VP-101) to assess soil property changes with depth. Dry density ranged from 93.6 pounds per cubic foot (lbs/ft^3) at 50 ft bls, to 97.1 lbs/ ft^3 at 20 ft bls [equivalent to 1.5 to 1.56 grams per cubic centimeter (g/cm^3)]. Moisture content increased with depth and ranged from 16.8 percent at 10 ft bls, to 28.5 percent at 30 ft bls. The porosity of these samples, calculated assuming a solid density of 2.65 g/cm^3, range from 0.41 percent to 0.43 percent. TOC was measured at four depths in AS/SVE-101. At 10 ft bls, the TOC was 0.079 percent and at the other depths (between 20 and 70 ft bls) TOC was 0.098 percent. These values represent fractional organic carbon content (f_{oc}) of 8×10^{-4} to 1×10^{-3}.

There is a sharp transition at approximately 70 ft bls to sands and gravels, typically well graded. Gravel fractions ranged from about 5 to 85 percent and were angular to sub-angular, based on estimates made from drill cuttings. The water table is typically encountered at about 100 ft bls. The sands and gravels extend to a depth of at least 260 ft bls on-site and 270 ft bls one-quarter mile northwest of the former Unichem facility. The sand and gravel aquifer is underlain by a thick clayey interval that extends to at least 750 ft bls at MW-104D and 550 ft bls at MW-119D.

4.2 Site Hydrogeology and Groundwater Conditions

Currently, groundwater is encountered at the Site at a depth of approximately 120 to 125 ft bls. Groundwater flow directions vary considerably. In general, groundwater flow direction currently is to the northwest, but was to the west and southwest prior to August 2012. In December 2006, groundwater at the Site had a westerly flow direction with a very low gradient of 0.0005 ft/ft. There also appears to have been a northward component of groundwater flow in the past based on the distribution of PCE in groundwater. The available monitoring data does not show any evident seasonal variation in flow directions, suggesting that the observed fluctuations are in response to large-scale, long term changes in groundwater flow patterns possibly in response to pumping in the basin. Observed changes in contaminant concentrations in shallow monitoring wells along the southern margin of the solute plume likely are due to the change in flow direction (see Section 4.5).

Aquifer test results and historic water level measurements indicate groundwater conditions with a relatively flat hydraulic gradient and high transmissivity values. Water levels between a nested well pair (MW-104S and MW-104D) have shown head differences of 20 to 100 ft. The shallow well (MW-104S) is largely unaffected by short-term changes in regional groundwater pumping; whereas the deeper well (MW-104D) shows seasonal rises and declines that coincide with seasonal pumping of nearby municipal supply and irrigation wells. However, the broad patterns of water level fluctuations are consistent with non-negligible hydraulic connection between the shallow and deep aquifers.

Hydraulic testing at the Site indicates that the aquifer has a very high transmissivity and hydraulic conductivity. Hydraulic conductivity estimates range from approximately 725 ft/day to 2,015 ft/day. The average hydraulic conductivity is approximately 1,400 ft/day. These analyses imply that the rate of solute migration in groundwater beneath the Site is potentially high, although the relatively shallow hydraulic gradient that exists in the area will limit migration rates. Some anisotropy is indicated by the maximum drawdowns detected at MW-101 through MW-103 during pumping of EW-101. However, the magnitude of this effect at the Site is unknown due to the limited area of coverage for these monitoring wells.

The groundwater flow direction over the period of observation (2002 – 2013) has ranged from generally westward to generally northwestward, and hydraulic gradients have been relatively uniform. Hydraulic gradients were calculated during year 2013 between data pairs G-7 and MW-104S, and between MW-114 and MW-113. Each well pair is on a line that is approximately parallel to the northwestward hydraulic gradient that existed during 2013. The hydraulic gradient between G-7 and MW-104S ranged from 0.00048 to 0.00067 ft/ft, and averaged 0.00055 ft/ft; the hydraulic gradient between MW-114 and MW-113 ranged from 0.00048 to 0.00061 ft/ft, and also averaged 0.00055 ft/ft.

The average linear velocity (v) of groundwater flow is calculated as:

$$v = \frac{KI}{n_e}$$

Where:

K is the hydraulic conductivity (ft/day),

I is the hydraulic gradient (ft/ft), and
n_e is the effective porosity (cm^3/cm^3).

Based on the average hydraulic conductivity estimate of 1,400 ft/day and an assumed effective porosity of 0.25, the observed gradients yield an average linear velocity of groundwater flow ranging from 2.7 ft/day to 3.7 ft/day, and averaging 3.1 ft/day during year 2013.

4.3 Contaminants of Concern (COCs)

VOCs of concern in the subsurface include PCE and TCE. PCE, which occurs in both vadose zone soils and in groundwater beneath the Site, is the primary VOC of concern. Concentrations measured in soil vapor and groundwater beneath the Site may indicate the presence of non-aqueous phase liquid (NAPL). Groundwater concentrations as high as 6,600 µg/L have been detected at the Site that is about 3% of the solubility of PCE (200,000 µg/L). Cohen and Mercer (1993) suggest that, in general, groundwater concentrations of 1% of solubility are indicative of the presence of NAPL.

Arsenic is present in soils and groundwater, but there is no spatial pattern to arsenic concentrations that would be consistent with a release. Rather, arsenic appears to be a naturally occurring constituent that is not Site-related.

4.4 Transport and Fate in Vadose Zone

More than half of the vadose zone consists of fine-grained materials (clay and silty-clay with small amounts of fine sand) to a depth of approximately 70 ft. COCs released near the land surface are expected to have migrated downward through these fine-grained materials into the underlying vadose and saturated gravel. Migration of COCs in the vadose zone would result from several mechanisms including 1) density-driven migration of any DNAPL present; 2) vapor phase transport; and 3) advective transport as a dissolved phase within any seepage originating from infiltration of precipitation or other sources of water at the land surface. With regard to vapor phase and advective transport, whenever vadose soil pore water concentrations exceed both MCLs and groundwater concentrations, there is potential for groundwater to be impacted.

Soil vapor data collected as part of the ERA (HGC, 2006) from deep soil borings indicated PCE concentrations ranging from 3 ppmv (approximately 20 µg/L) to 1996 ppmv (approximately 13,500 µg/L). All detected concentrations were large enough to represent potential impacts to groundwater as they implied soil pore water concentrations ranging from approximately 27 µg/L to approximately 18,000 µg/L.

The theoretical maximum PCE concentration expected in soil vapor in the presence of free product is approximately 164,740 µg/L, using a vapor pressure for PCE of 18.47 mm Hg at 25^{o} C and 1 atmosphere pressure. The highest detected concentration of 13,500 µg/L (at a depth of 60 ft in boring VP-103) is more than 8% of the theoretical maximum concentration.

Based on criteria presented in Bentley and Walter (1997), soil vapor concentrations exceeding 10% of the theoretical maximum concentration calculated from a compound's vapor pressure can be considered indicative of NAPL. Although the concentration of 13,500 µg/L detected in soil vapor is about 8.2% of the theoretical maximum concentration of 164,750 µg/L, the detected concentration is high enough that the presence of NAPL cannot be ruled out.

Operation of the SVE system has removed PCE mass and reduced concentrations in soil, reducing the potential for continuing impacts to groundwater. However, the system is likely to have been relatively ineffective in removing any potential DNAPL that may have been present in fine-grained materials located at depths shallower than 70 ft. Any DNAPL present in fine-grained soils and any residual soil concentrations implying PCE soil pore water concentrations exceeding MCLs represent potential ongoing sources to groundwater.

PCE concentrations in shallow soil vapor at the former Unichem facility generally exceeded the RSL for inhalation exposure by workers and a screening level for vapor migration to indoor air developed using an attenuation factor of 0.03. This suggests that vapor migration to indoor air potentially could be an exposure pathway of concern if a building was constructed on the property in the future.

Some potential exists in off-property areas for volatilization of COCs from the water table into overlying soils creating conditions favorable for vapor migration into buildings. However, the predominantly fine-grained soils present from the land surface to a depth of approximately 70 ft bls will act as a partial barrier to upward transport, thus minimizing the potential for vapor impacts.

4.5 Transport and Fate in Groundwater

Groundwater is migrating at rates ranging from approximately 2.7 ft/day to 3.7 ft/day, and averaging 3.1 ft/day based on water level data collected during year 2013. These are also the expected migration rates of a conservative (non-sorbing) solute assuming no hydrodynamic dispersion, degradation, or volatilization. Dissolved COCs are expected to have migrated in the same direction as groundwater. Groundwater flow directions over the period of observation (2002 – 2015) have ranged from generally westward to northwestward.

Circa August 2012, the observed groundwater flow direction changed from the west to northwest and PCE concentrations have declined in the western shallow groundwater monitoring wells (i.e. G-10, MW-108, MW-115 and MW-109S) along the southern margin of the solute plume in response to the altered flow direction. Currently, PCE in groundwater is known to extend at least 3,800 ft to the north, approximately 3,850 ft to the northwest, and at least 3,000 ft to the west of the former Unichem property. As discussed above and in Section 8, the areal extent of dissolved COC is not fully defined to the north and west.

COCs (primarily PCE) at the Site are expected to move more slowly than the groundwater due to sorption onto soil organic carbon, volatilization, and degradation. For PCE, a retardation factor of approximately 2 (due to sorption) is reasonable assuming an organic carbon partition coefficient of 155 L/Kg, and for the sands and gravels, an organic carbon content of 0.1%, a soil bulk density of 1.7 Kg/L, and an effective porosity of 0.25.

Using the above calculated rates of groundwater flow (2.7 ft/day to 3.7 ft/day), assuming a dissolved PCE retardation factor of 2, and assuming no hydrodynamic dispersion, dilution by PCE-free recharge, degradation, volatilization of PCE from the groundwater, or downward PCE migration, approximately 5.6 to 8 years would suffice for PCE to migrate from the former Unichem property to its current northern extent; approximately 5.6 to 8.1 years would suffice for PCE to migrate from the former Unichem property to its current northwestern extent; and approximately 4.4 to 6.3 years would suffice for PCE to migrate from the former Unichem property to its currently estimated western extent. The former Unichem property is known to have been a source of PCE to groundwater for significantly longer than 8 years, suggesting that on-property remedial activities, natural attenuation, and possible downward migration, are limiting the rate of expansion of the PCE plume in shallow groundwater.

Volatilization of PCE from groundwater into the vadose zone in areas where soil pore water concentrations are lower than groundwater concentrations is expected to reduce groundwater concentrations and to reduce apparent rates of migration. Likewise, biodegradation (and any abiotic chemical degradation) of PCE, dilution by any PCE-free recharge, and any downward migration of PCE, will reduce shallow groundwater concentrations and thus lower the apparent rates of migration. Near plume margins, PCE concentrations will be reduced by hydrodynamic dispersion. Depending on the specific conditions, the plume boundary (defined by a concentration equal to the MCL) may appear to move more slowly than the average rate of PCE migration.

Because the majority of the plume is currently not under hydraulic control, and in spite of the mechanisms discussed above that will act to reduce rates of PCE migration and lower concentrations, the PCE plume is expected to continue to expand downgradient to the northwest. Furthermore, migration of PCE from soils to groundwater in areas where soil pore water concentrations remain above groundwater concentrations, and in areas where any residual DNAPL may exist in soils, will contribute to the longevity and continued expansion of the plume. Any residual PCE DNAPL that may exist in the saturated zone will also contribute to the longevity and continued expansion of the plume.

5. LAND AND WATER USE EVALUATION

This evaluation examines information regarding the current and reasonably foreseeable future uses of land and water that have been or could be impacted by the contaminant release at the Site, pursuant to AAC R18-16-406(D). It will be used to assess the potential for exposure to Site-related contaminants in the risk evaluation. Questionnaires were sent to the Town of Gilbert (TOG) and the Salt River Project (SRP) to obtain current relevant information and responses are included as Appendix J.

5.1 Land Use

5.1.1 Planning and Zoning

The entire Site is located within the Town of Gilbert. Arizona state law requires every incorporated municipality to have a General Plan that establishes a policy for the municipality's physical development. The TOG's General Plan provides a vision and a decision-making guide for physical, economic and social development over the next 10 to 20 years (TOG, 2012).

The Site is located immediately west of the Gilbert Heritage District, the historic downtown center of Gilbert, which is designated as both a Growth Area and a Character Area (TOG, 2012). A Redevelopment Plan for the Heritage District that was evolved in 1991 and updated in 2001 and 2008 centers on encouraging development and reinvestment to improve economic vitality in the area (TOG, 2012).

The land where the former Unichem facility is located is zoned by the TOG for General Industrial (GI) uses. The portion of the Cooper and Commerce WQARF Site bounded to the west by North Cooper Road and to the north by West Guadalupe Road (along the Union Pacific Railroad corridor) is zoned primarily for GI and Light Industrial (LI) uses. Zoned land uses at the portion of the Site situated north of West Guadalupe Road and west of North Cooper Road are primarily Single Family Residential, with some General Commercial, Neighborhood Commercial, and Multi-Family Residential. The small section of the Site located east of North Cooper Road and south of the Western Canal is zoned for Public Facility/Institutional use, and is the location of the Neely Ranch Riparian Preserve (TOG, 2013).

5.1.2 Current and Projected Land Use

Current land use in the area of the Site is shown in Figure 24. Current land use in the southeastern portion of the Site (south of West Guadalupe Road, East of North Cooper Road) is comprised mainly of active and inactive industrial facilities along the Union Pacific Railroad corridor. The southernmost section of this area, south of the Western Canal, hosts the Neely Ranch Riparian Preserve, which consists of an artificial wetland centered on TOG infiltration basins recharging reclaimed water. West of North Cooper Road and north of West Guadalupe Road, land use within the Site is dominated by residential areas interspersed with supporting commercial properties (TOG, 2012).

The former Unichem facility on Parcel 302-15-025 was divided into Parcels 302-15-025A and 302-15-025B, which were later replatted to Parcels 302-15-361 and 302-15-362, respectively, in 2010. The western portion of the 619 West Commerce Avenue property, Parcel 302-15-361, has been owned by RLD Holdings, LLC since 2000, with a listed use of "miscellaneous commercial"; the eastern portion, Parcel 302-15-362, has been owned by KB East Properties, LLC since 2007, with a listed use of "parking" (HGL, 2014).

The TOG currently maintains several easements and operates the Neely Wastewater Treatment Plant, the Neely Recharge Facility, and the Neely Ranch Riparian Preserve within the Site area. The nearby Gilbert Historic District is targeted by the TOG for redevelopment efforts, including mixed-use development (TOG, 2012). While the Site is located outside the official Historic District boundaries, redevelopment efforts in the area could extend to areas within the Site. If this were to occur, contaminated groundwater and soils underlying the Site could present additional risks to possible future redevelopment activities and land uses.

SRP does not expect to undertake service or infrastructure expansions within the Site, as the area is built out, but will continue routine maintenance and operation of the power transmission and distribution lines, irrigation turnout structures, lateral canals, and supply wells located within the Site (Appendix I).

5.2 Water Use

The TOG is located in the Phoenix Active Management Area and in 2010 was granted an Assured Water Supply (AWS) designation through the end of 2025 (TOG, 2012). The AWS program requires water providers to demonstrate an adequate supply of renewable, potable water resources to meet demand for 100 years. Per AWS requirements, the TOG has been making ongoing reductions in groundwater pumping and developing renewable water supplies. Groundwater resources can be considered renewable if pumping is offset by Long Term Storage Credits accrued via artificial groundwater recharge (TOG, 2012).

5.2.1 Available Water Resources

The TOG's water resources portfolio consists of surface supplies from SRP, the Roosevelt Water Conservation District (RWCD), and the Central Arizona Project (CAP), as well as groundwater from 18 production wells (TOG, 2012). Additionally, the TOG's Reclaimed Water program has reduced groundwater pumping in recent years. Surface water supplies are vulnerable to drought conditions, which are predicted to increase in prevalence in the southwest into the future (Carollo, 2006).

Of the TOG planning area's 45,000 acres, about 11,600 acres have water rights from SRP. So-called "on-Project" areas are generally located west of the Eastern Canal. These water rights are legally attached to the land and cannot be used elsewhere. SRP annually quantifies surface water allocations to areas of the TOG within its service area according to storage and flows on the Salt and Verde River reservoir systems. Groundwater pumped by SRP and delivered to the TOG counts against the TOG's groundwater storage credits. Under shortage conditions, SRP increases groundwater pumping to meet on-Project demands, meaning that the TOG uses more of its groundwater storage credits in times of drought. Surface water supplied to the TOG by SRP is treated to drinking water quality prior to delivery to users (TOG, 2012).

Portions of the TOG between the Eastern Canal and the RWCD Canal amounting to 20,815 acres have water rights from the RWCD. These water rights are legally attached to the land and cannot be used elsewhere. RWCD receives water from the SRP reservoir and canal system into its own canals. The volume of the TOG's surface water allotment from RWCD is a percentage of the total volume of water diverted by SRP at the Granite Reef Dam. The TOG is also entitled to groundwater righted to RWCD, but only utilizes the surface water allotment. The volume of RWCD surface water allocated to the TOG's RWCD service area is expected to be insufficient to meet demands at build-out, and will require supplementation by other sources like groundwater and CAP water (Carollo, 2006; TOG, 2012).

An additional supply of surface water to the TOG is the CAP, which delivers Colorado River water from Lake Havasu to Maricopa, Pima, and Pinal Counties. The TOG possesses rights to CAP water under various lease agreements and contracts amounting to nearly 19,000 acre-feet per year. However, much of this water is low-priority, meaning that in times of low flow on the Colorado River, it will not be delivered. Due to drought and over-allocation of CAP water shortages in CAP supply are expected to occur as early as 2015. Additionally, CAP deliveries to the TOG are currently limited by infrastructure, as the TOG only has the capacity to deliver and treat 7,235 acre-feet per year of CAP water (Carollo, 2006).

Through ADWR's AWS Rules, the TOG has a one-time allocation of groundwater that it is allowed to pump without replenishment for 100 years, starting in 1995. An additional volume of groundwater may be pumped by the TOG without replenishment, representing incidental recharge from infrastructure losses and outdoor water use by customers. These allocations total about 3,000 acre-feet; groundwater pumping beyond this undertaken by the TOG must be offset with groundwater recharge credits or via Central Arizona Groundwater Replenishment District (CAGRD) membership.

Since the early 2000s, the TOG has been recharging reclaimed water and excess CAP supplies to build up groundwater recharge credits. The TOG stores water in the Granite Reef Underground Storage Project (jointly owned by SRP and several municipalities), CAP recharge facilities, the Gilbert Riparian Preserve on East Guadalupe Road, the Neely Recharge Facility in the southern portion of the Site, and at the South Area Recharge Facility on South Higley Road

5.2.2 Current and Projected Water Use

TOG potable water use totaled 47,595 acre-feet in 2011, serving 212,084 users. Residential demand accounts for 70% of this water, with the remaining 30% utilized for non-residential uses. The TOG operates two water treatment plants that treat up to 57 MGD of SRP-, RWCD-, and CAP-supplied surface water to potable quality. This capacity is slated to be expanded to 59 MGD when required by growth. The TOG also operates 18 potable water supply groundwater wells that yield up to 41.6 MGD of potable water. Seven additional wells are planned, bringing the total potable groundwater production capacity of the TOG to 55 MGD at build-out (TOG, 2012).

The TOG also operates two water reclamation facilities (WRF), the Neely WRF, located immediately east of the former Unichem facility, and the Greenfield WRF, operated jointly with the City of Mesa and the Town of Queen Creek. Each plant produces A+ quality reclaimed water, with reclaimed water production totaling 12,683 acre-feet in 2009. In 2009, 8,553 acre-feet of this reclaimed water was recharged and accrued groundwater storage credits, with the remainder reused for irrigation and water features (TOG, 2012).

The TOG's Neely Recharge Facility (NRF), located immediately south of the former Unichem facility, recharges water from the Neely WRF via 11 recharge basins. The discharges are regulated under APP number P-102716 issued by ADEQ's Water Quality Division. The TOG has partnered with ADEQ in limiting discharge to the NRF recharge basins in order to minimize the impact of groundwater mounding resulting from artificial recharge on the ongoing remediation of contaminants associated with the Site (Carollo, 2006). The TOG also limits the pumping of groundwater recovery wells G-7, G-8 and G-10, located south of the Site at the NRF

(Appendix I). The TOG applied in late 2013 to ADWR for permission to incrementally increase recharge flows at the NRF (ADWR, 2013), so as to increase accrual of groundwater storage credits, and hopes to use wells G-7, G-8, and G-10 for recovery of recharged water once groundwater quality in the area improves (Appendix I).

The TOG operates seven non-exempt wells within and near the Site (Table 14). One TOG drinking water supply well, TOG #15 (ADWR 55-542431), is located just over 0.5 miles down gradient from the Unichem facility at the southwest corner of West Guadalupe Road and North Cooper Road, within the Site boundaries, and is threatened by the groundwater contamination at the Site. TOG #15, which pumped 234.7 acre-feet of water in 2013, is jointly operated by SRP and identified by SRP as well 29E-1.0S (Figure 24; Table 14).

A different non-exempt production well (ADWR 55-541861) was formerly designated as TOG #15, but has not been pumped in roughly a decade and does not currently have a pump installed (Jordan, 2014). However, the former TOG #15 has not been capped or abandoned (Jordan, 2014), and is located about 0.75 miles northwest (down gradient) from the Unichem facility. Therefore, the former TOG #15 is threatened by groundwater contamination at the Site (Figure 24; Table 14).

An additional non-exempt TOG drinking water supply well, TOG #14 (ADWR 55-534889), is located roughly 0.5 miles southeast of the Site, along the Union Pacific Railroad corridor between North Neely Street and North Gilbert Road. TOG#14 is up gradient from groundwater contamination at the Site (Figure 24; Table 14), and pumped 228.9 acre-feet of water in 2013 (Appendix I; ADWR, 2015).

The TOG also operates several non-exempt wells in the Site vicinity that are used for recovery of recharged water for irrigation and recreational uses and groundwater monitoring (Table 14). These are R-1 (ADWR 55-595204), located about 4000 ft west of the former Unichem facility outside the Site boundary, G-7 and G-8 (ADWR 55-524081 and 55-524082, respectively), located just southeast of the former Unichem facility outside the Site boundary, and G-10 (ADWR 55-539954), located just south of the former Unichem facility (Figure 24). Non-exempt well R-1 pumped 163.5 acre-feet of water in 2013 and is used to supply water to local lakes (Appendix I; ADWR, 2015). Well R-1 is located down-gradient from the former Unichem facility, while G-10 is cross-gradient and G-7 and G-8 are up gradient. Groundwater contamination at the Site may pose a risk at R-1, as the western plume boundary has not been well-delineated. Wells G-7, G-8, and G-10 are also utilized for groundwater monitoring purposes, along with designated monitor well G-9 located within the Site (Figure 2).

No TOG drinking water wells have been impacted above MCLs by COCs from the Site, though down gradient TOG #15 is at risk (Appendix I).

SRP operates various power transmission and distribution lines, irrigation turnout structures, lateral canals, and three non-exempt groundwater supply wells used for irrigation, recreational, and municipal supply in the Site vicinity (Figure 24; Table 14): 29E-1.0S (TOG #15; ADWR 55-542431), 29E-1.5S (ADWR 55-617105), and 29E-2.0S (ADWR 55-617104). Down gradient SRP 29E-1.0S/TOG #15 has not been impacted above AWQS by the groundwater contamination at the Site, but 134 acre-feet were pumped from this well in 2011 and it is at risk. Non-exempt well SRP 29E-1.0S/TOG #15 replaced non-exempt well ADWR 55-617106, which was originally completed in 1949 to 710 ft bls. In 1994, SRP abandoned ADWR 55-617106 and replaced it with SRP 29E-1.0S/TOG #15. Non-exempt well SRP 29E-1.0S/TOG #15 is completed to a total depth of 970 ft bls, with a screened interval in the middle alluvial aquifer from 570 to 950 ft bls.

SRP 29E-1.5S is located approximately 1,400 ft west (down gradient) of the former Unichem facility at the southeast corner of North Cooper Road and the Western Canal. PCE was first detected in this well at a concentration of 1.3 µg/L in 2007; a sample collected in 2009 detected PCE at a concentration 12.4 µg/L (HGC, 2013b). As part of a May 25, 2010 agreement between ADEQ and SRP regarding the discharge of treated groundwater from the Site to SRP Lateral 9.5, SRP agreed to minimize pumping of SRP well 29E-1.5S except under drought conditions and to meet short-term operational requirements (ADEQ and SRVWUA, 2010). SRP well 29E-1.5S was completed in 1949 to a depth of 596 ft bls, with a screened interval straddling the upper and middle alluvial aquifers from 210 to 580 ft bls. SRP well 29E-1.5S was permitted as a recovery well in 1990 and allotted 150 acre-feet per year in pumpage to maintain artificial lakes in the area. Total pumpage from SRP well 29E-1.5S was 66.9 acre-feet in 2012.

SRP well 29E-2.0S, at the northeast corner of West Elliot Road and North Cooper Road, is located up gradient of the former Unichem facility, outside the Site boundaries, and has not been impacted by groundwater contamination at the Site. SRP well 29E-2.0S was completed in 1940 to a total depth of 400 ft bls with a screened interval straddling the upper and middle alluvial aquifers from 124 to 385 ft bls. Total pumpage from SRP well 29E-2.0S was 1.19 acre-feet in 2013 (Appendix I; ADWR, 2015).

SRP has no current plans for further development of infrastructure or groundwater resources in the vicinity of the Site, as the area is largely built-out. Water quality concerns at the Site are of interest to SRP, as groundwater plays a key role in making up drought-induced shortages in their service area (Appendix I).

The only other non-exempt wells located within 1.0 mile of the Site is EW-101, the extraction well operated as part of ERA activities (Figure 2; Table 14). The Maricopa Association of Governments owns three exempt wells that are used as monitoring wells, and designated by the TOG as G-1, G-2, and G-5 (Figure 2; Table 14). All three of these wells are completed in the upper alluvial unit. Wells G-1 and G-2 are located south of the former Unichem facility outside the Site boundary, and are up gradient of contamination at the Site. Therefore, groundwater contamination at the Site would not be expected to threaten G-1 and G-2 were they to be used as exempt production wells. Well G-5 is located 1.0 mile to the northwest of the former Unichem facility near the corner of North Nevada Street and West Encinas Street, down gradient of contamination at the Site (ADWR, 2014). The concentration of PCE was not detected in an October 2013 sample from monitoring well MW-113 located approximately 0.3 mile east of G-5. PCE has been detected at concentrations below the AWQS of 5 µg/L at MW-113 since it was installed in 2011, and groundwater contamination from the Site could threaten G-5 were it to be used as an exempt production well rather than a monitoring well.

There are four privately-owned, exempt wells within 1.0 mile of the Site (Figure 24; Table 14). No pumping data are available for these wells, which are listed as domestic water production wells. The E.W. Cooley well (ADWR 55-636808) has a listed location immediately west of TOG #15, down gradient of contamination at the Site. The Eldon Cooley well (ADWR 55-636811) is listed as being located 0.9 mile northwest (down gradient) of the former Unichem facility. Notably, ADWR was unable to locate both of these wells (55-636808 and 55-636811) during a 2005 inventory of wells in the area, and they may have been destroyed without being officially abandoned (ADWR, 2005). The Hunter Ditch Lining well (ADWR 55-635924) is located approximately 1200 ft northwest (down gradient) of the former Unichem facility. Due to their down gradient location, these three wells may be threatened by groundwater contamination at the Site.

The L.M. Pace well (ADWR 55-634676) has a listed location 0.75 mile southwest (cross gradient) of the former Unichem facility, and is therefore likely not at risk from contamination at the Site (ADWR, 2014). ADWR was also unable to locate the L.M. Pace well during its 2005 inventory of wells in the area, and this well may have been destroyed without being officially abandoned (ADWR, 2005).

Approximately 25 monitoring wells are located within the Site, and owned by ADEQ, Simon New Mexico, Inc., the TOG, and McAfee Consolidated. ADWR also identifies two geotechnical and mineral exploration wells that were drilled in 1994 within the Site and subsequently abandoned (ADWR, 2015).

6. RISK EVALUATION

The objective of the risk evaluation is to evaluate and quantify potential risks associated with the Site, consistent with A.A.C. R18-16-406(E), that will support decision-making regarding appropriate remedial actions. This risk evaluation identifies relevant human receptors and exposure scenarios, evaluates potential exposures and characterizes the current risks to public health and the environment from COCs. Due to the presence of COCs being at depth and the urban character of the Site, evaluation of ecological receptors is not warranted.

COCs identified for the Site include PCE, TCE and arsenic based on their presence in groundwater at concentrations greater than their respective AWQS. However, arsenic in groundwater does not appear to be Site-related and is excluded from the risk evaluation. Additionally, PCE and TCE have been detected in soil and/or soil vapor at various locations. Relevant toxicity values for the COCs are identified using the most current toxicity values consistent with EPA's toxicity value hierarchy provided in OSWER Directive 9285.7-53 (EPA, 2003) and are summarized in Table 15.

Characterization of the exposure setting is based on an evaluation of current land and water use in the vicinity of the Site (Section 5). Land use in the area of the Site includes commercial/industrial and residential settings and identified potential receptors include residents and commercial/industrial workers.

The impacted media include soil, soil vapor and groundwater below the former Unichem facility. Additionally, groundwater is impacted to the west and north of the property and soil vapor impacts are reported from the location of MW-117.

6.1 Exposure Pathways

The identification of potentially complete exposure pathways is based on the following four (4) components: 1) a source and mechanism of chemical release, 2) a retention or transport medium, 3) an exposure point (i.e., a setting where potential human contact with the chemical-affected medium or media occurs), and 4) a route of exposure at the exposure point (e.g., ingestion). A complete exposure pathway is present when all four of these components are present.

6.1.1 Groundwater Use

Consumptive use of groundwater is a potential exposure pathway of concern when water supply wells are present that draw water from the underlying aquifer. Exposure can occur through direct ingestion, inhalation or dermal contact with contaminated groundwater. Private water supply wells (Hunter Ditch Lining and E.W. Cooley; Figure 24) are present within the Site boundary and it is unknown whether they are impacted by groundwater contamination from the Site or are currently being used or in the case of the E.W. Cooley well even exist. Several water supply wells, producing from the deeper portion of the aquifer are present in and adjacent to the Site, suggesting the potential for these wells to be impacted by contaminated groundwater from the Site. Future development of the groundwater resource present in the shallow aquifer in the area would be impacted by groundwater contamination. Based on the potential future use of the groundwater as a water supply, exposures due to direct ingestion, inhalation or dermal contact with contaminated groundwater would be considered a complete exposure pathway for the Site.

Evaluation of cancer risk and non-cancer health hazard for PCE and TCE in tap water was performed using the online U.S. EPA Regional Screening Level (RSL) calculator (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search). The RSL calculator determines risk using standard exposure factors and equations described in the User's Guide (EPA, 2013). Concentrations for the COCs in monitoring well MW-106 represent the highest concentrations of PCE (59 µg/L) and TCE (15 µg/L) at the Site and the maximum reported concentrations from 2013 are used as the basis for the risk calculations for the shallow aquifer. Output from the calculator using these exposure concentrations is included as Appendix K.

A summary of the cancer risk and health hazard for ingestion, inhalation and dermal exposures by residents from tap water, should the shallow aquifer be developed for drinking water use, are presented in Table 16. Cancer risk estimates from combined exposure by these routes range from 6.06×10^{-6} for PCE to 6.88×10^{-5} for TCE and the cumulative cancer risk estimate is 7.49×10^{-5}. These values exceed the *de minimis* level of 1×10^{-6} and the cumulative risk is within the accepted risk management range of 1×10^{-4} to 1×10^{-6} for carcinogenic risk. Non-cancer health hazards are determined separately for child and adult receptors (Table 16). Hazard quotients for a child range from 1.7 for PCE to 5.82 for TCE with a hazard index of 7.52; those for an adult range from 1.14 for PCE to 4.55 for TCE with a hazard index of 5.69. All of these estimates exceed the target value of one. TCE is the major risk driver for both cancer and non-cancer effects.

6.1.2 Soil Direct Contact

Extensive soil sampling has been conducted at the former Unichem facility. The property is currently a commercial/industrial land use and it is not anticipated that this use will change in the future. The soil direct contact pathway is considered to be complete at the Site based on the presence of commercial workers. However, none of the surface soil samples collected at a depth of one foot bls exceeded the nonresidential SRLs for any of the analyzed chemicals. PCE exceeded the residential SRL in one of 15 surface soil samples. A formal risk characterization is not considered warranted based on the *de minimis* levels of exposure for surface soil.

6.1.3 Soil Vapor

The potentially complete exposure pathways at the Site include transport of vapor-phase contaminants to outdoor and indoor air with subsequent inhalation exposure. Inhalation exposure from outdoor air would be negligible due to the effects of atmospheric mixing. However, potential vapor intrusion into buildings with subsequent inhalational exposure to indoor air is of potential concern.

PCE is present in soil vapor over the majority of the former Unichem facility based on shallow soil vapor samples (Figure 7). There are currently no buildings on the former Unichem facility located in close proximity to soil borings where soil vapor concentrations have been measured. Therefore, while the vapor migration pathway can be considered complete under current conditions, no quantitative estimate of the magnitude of potential exposures can be made.

The potential exists for future construction of a building on the former Unichem facility that may be impacted by vapor intrusion of PCE. The degree of potential impact would depend on the specific location of any building. In 2005 reported PCE concentrations in shallow soil vapor (1 to 5 ft bls) range from 3.8 mg/m^3 to 9,800 mg/m^3. Quantitative estimates of the magnitude of potential exposures to PCE were calculated based on this range of values (Table 17). More recent PCE soil vapor concentrations from three deeper samples at 10 ft bls collected in 2012 from soil borings B-1W, B-2ESE, and B-3NE range from 0.176 to 9.49 mg/m^3 (Table 4), however these samples are not directly comparable to the 2005 shallow soil vapor samples and are from a localized area of the former Unichem property that is unlikely to be representative.

Vapor migration to indoor air is evaluated using an empirical attenuation factor of 0.02 (EPA, 2002) to estimate indoor air concentrations of PCE (Table 17). Cancer risk and non-cancer health hazard for inhalation are calculated using standard exposure frequency and duration factors for a commercial worker scenario. Evaluation was performed using the RSL calculator and output is included as Appendix J. The estimated cancer risks and hazard quotients for commercial worker exposure are shown in Table 17. Cancer risk estimates for inhalation exposure range from 1.61×10^{-6} to 4.16×10^{-3} and exceed the *de minimis* level of 1×10^{-6}; the maximum value exceeds the accepted risk management range of 1×10^{-4} to 1×10^{-6} for carcinogenic risk. The hazard quotient for the low end of the range is 0.434; less than the target value of one. The hazard quotient for the high end of the range is 1,120; substantially greater than the target value of one.

PCE was also detected in soil vapor from 10 ft bls at MW-117. Quantitative estimates of the magnitude of potential indoor air exposures to PCE, as well as estimated cancer risk and hazard quotient, for commercial worker exposure are shown in Table 17. The cancer risk estimate is substantially less than the *de minimis* level of $1x10^{-6}$ and the hazard quotient is substantially less than the target value of one.

6.1.4 Surface Water

There are no points of natural discharge of groundwater to surface water in the vicinity of the Site. Surface water in the area of the Site includes several man-made lakes and ponds situated to the west of the Site. Groundwater from recovery wells, especially R-1, is used to fill the lakes and ponds. However, none of these wells are known to be impacted above the AWQS by contamination from the Site.

The Western Canal runs east-west along the southern margin of the Site and carries irrigation water from the SRP. Effluent from the water treatment system for extracted groundwater from the former Unichem facility is discharged to the Western Canal under a Permit and does not contain contaminants above applicable surface water standards.

SRP indicates that many of the properties in the area of the Site are still irrigated with untreated surface water. Assuming partial or full body contact is a possibility with irrigation waters at the Site, the U.S. EPA regional screening level (RSL) for dermal contact with water would be 56 µg/L. Concentrations of PCE in the groundwater at the Site currently are below this RSL.

7. REMEDIAL OBJECTIVES

The remedial objectives (ROs) for the Site, pursuant to AAC R18-16-406(I), are based on the field investigation results and historical data, the Land and Water Use Study, and the Risk Evaluation. The RO report prepared by ADEQ is included as Appendix L. A Responsiveness Summary documenting the input from stakeholders and interested parties regarding the RI Report and how these were addressed is included in Appendix M.

Existing standards and guidelines, such as AWQS and other criteria accepted by ADEQ as appropriate for the media being evaluated, were used to evaluate potential effects on human receptors that may be exposed to COCs above appropriate standards or guidelines.

A preliminary evaluation of applicable or relevant and appropriate requirements (ARARs) for setting cleanup goals for the purposes of this RI indicates that, due to the presence of COCs in groundwater and soil at the Site, Arizona AWQS under 18 AAC 11-4 and Arizona SRLs under 18 AAC 7-2 are applicable requirements. Additionally, Safe Drinking Water Act maximum contaminant levels (MCLs) are considered applicable requirements. There are no available standards for contaminants in soil vapor. The EPA RSL table lists Superfund human health screening values for soil, air, and tap water. The RSLs are not promulgated standards, but rather guidance values that are considered.

The ROs focus on contaminants and media of concern and exposure routes and receptors. The ROs will be used during alternatives development, where remediation goals are established based on ARARs, to identify appropriate remedial technologies.

The RO for soil at the Site is to restore soil conditions to the remediation standards appropriate for the identified land use specified in A.A.C. R18-7-203 that are applicable to the hazardous substances identified. Remedial action is needed for the present time and for as long as the level of contamination in the soil threatens its intended end use.

The RO for groundwater at the Site is to protect, restore, replace or otherwise provide a water supply for potable or non-potable use by currently impacted, municipal, domestic, agricultural/irrigation and recreational well owners within or near the Site if the current and reasonably foreseeable future uses are impaired or lost due to contamination from the Site. Remedial actions will be in place for as long as the need for water exists, the resource remains available and the contamination associated with the Site prohibits or limits the use of groundwater for its intended end use.

The land and water use evaluation section of the RI report identified no uses of surface water in the area of the site. Therefore there are no remedial objectives required for surface water.

8. DATA GAPS

The most important data gap related to the Site is the lack of thorough delineation of the groundwater solute plume on the western margin. PCE concentrations exceeding the AWQS are present in MW-108, MW-109 and MW-115, the westernmost monitoring wells in the WQARF study area. Detection of PCE below the AWQS in TOG Well R-1 further to the west does provide some degree of control on the western side of the plume. However R-1 is located a substantial distance west of the existing monitoring well network and as R-1 is a supply well for TOG, additional monitor wells between the existing well network and R-1 are recommended.

Lack of detail regarding the vertical extent of the solute plume within the water table aquifer (i.e. from 165 ft to 280 ft.) constitutes a second data gap and vertical profiling to determine highest zone of contamination should be conducted. In addition, the water table and deeper aquifers are apparently separated by a several hundred foot clayey layer that may serve as an aquiclude limiting vertical migration of contaminants. However, low concentrations of PCE have been detected in the deep monitoring well, MW-104D, indicating that some hydraulic connection between the water table and deep aquifers at the Site may exist. Although recent samples are below the AWQS, samples collected in 2013 and 2014, during a period of westerly flow, detected PCE above the AWQS in the recently installed deep monitor well MW-119D near SRP Well 29E-1.5S. The SRP well is screened across both aquifers, possibly providing a direct conduit between them. Additionally, significant downward vertical gradient exists between the two aquifers suggesting the potential for vertical migration of contaminants. A pump test using one of the water supply wells located in the deep aquifer could address the hydraulic communication between these aquifers.

The factors controlling solute plume expansion to the north and northeast are not well understood based on available information. The solute plume margin is uncertain in this area where PCE concentrations are near the AWQS in MW-114 for recent groundwater monitoring events.

Geochemical characterization related to COC behavior is lacking which precludes effective evaluation of natural attenuation behavior.

The capture zone for EW-101 was evaluated during a period of southwesterly flow. The capture zone likely has changed somewhat due to the change in groundwater flow direction to the northwest since it was last evaluated. The current capture zone should be reevaluated if flow continues to the northwest and the groundwater remediation system is restarted.

9. CONCLUSIONS

Contaminant releases at the former Unichem facility have resulted in impacted soil in the vadose zone and groundwater underlying the property. The primary chemical of concern is PCE that likely exists (at least locally) in the vadose zone and groundwater as DNAPL. A groundwater solute plume extends at least 3,000 ft to the west and north of the facility. TCE is also present at levels exceeding the AWQS, in one well MW-106, and available information does not support a determination of whether the TCE is derived from a separate source release or is a product of PCE degradation in the subsurface.

Since PCE concentrations in MW-114 are near the AWQS, the northern and northeastern edge of the solute plume or potential WQARF boundary is uncertain. In addition, since the PCE concentrations in MW-108 and MW-109 (estimated downgradient wells) were above the AWQS, the western edge of the solute plume has also not been delineated. PCE concentrations in MW-113 were below the AWQS and the solute plume and WQARF boundary can be considered defined to the northwest.

Groundwater flow direction has changed from predominantly west and southwest to the northwest resulting in observed declines of contaminant concentrations in shallow monitoring wells along the southern margin of the solute plume.

Investigative efforts to date have focused on defining the extent of the groundwater solute plume and little attention has been given to evaluating concentration distribution within the solute plume. Consideration of the strength of a source or solute plume improves evaluation of natural attenuation and assessment of risks posed by the contamination to downgradient receptors.

Arsenic does not appear to be Site-related based on its widespread distribution and lack of any evident pattern indicating a localized source. It is likely that the relatively elevated arsenic concentrations are attributed to a background conditions in the soil and aquifer.

The SVE system on the former Unichem facility has removed a significant mass of contaminants from the vadose zone near the former drywell source area. The groundwater extraction and treatment system has reduced groundwater concentrations in the source area. However, it is unclear that the system, as it was configured and operated, maintained hydraulic control of the source area.

Data gaps exist related to the extent and distribution of contamination in groundwater and characterization of the hydrogeologic system. The natural attenuation of COCs in groundwater is not defined and the controlling geochemical conditions are not characterized. Additional investigations to address these data gaps are necessary to adequately evaluate feasible remedial alternatives. Overall at the current time, the extent of contamination is adequately defined and understood to complete the Remedial Investigation Report. The aforementioned data gaps may be evaluated as part of the Feasibility Study process.

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11. LIMITATIONS

The opinions and recommendations presented in this report are based upon the scope of services and information obtained through the performance of the services, as agreed upon by HGC and ADEQ. Results of any investigations, tests, or findings presented in this report apply solely to conditions existing at the time HGC's investigative work was performed and are inherently based on and limited to the available data and the extent of the investigation activities. No representation, warranty, or guarantee, express or implied, is intended or given. HGC makes no representation as to the accuracy or completeness of any information provided by other parties not under contract to HGC to the extent that HGC relied upon that information. This report is expressly for the sole and exclusive use of ADEQ and for the particular purpose that it was intended. Reuse of this report, or any portion thereof, for other than its intended purpose, or if modified, or if used by third parties, shall be at the sole risk of the user.

TABLES

TABLE 1
Well Completion Details
Cooper and Commerce WQARF Site

Well Name	ADEQ Well Number	ADWR 55-No.[a]	Install Date	Well Depth (ft bls)	Casing Diameter (inch)	Screened Interval (ft bls)	Northing (b)	Easting (b)	Measuring Point Elevation (ft amsl)
MW-101	51482	545252	Oct-94	165	4	120-160	857657.00	734873.08	1226.20
MW-102	51483	545253	Oct-94	165	4	120-160	857622.06	734735.31	1228.32
MW-103	51484	545254	Oct-94	165	4	120-160	857555.10	734842.45	1226.69
MW-104S	64747	598801	July-03	170	4	115-165	859093.85	733526.87	1222.98
MW-104D	64748	598802	July-03	615	5	580-610	859074.90	733526.42	1223.42
MW-105	67518	212563	June-06	165	4	120-160	858095.96	735078.51	1229.11
MW-106	67519	212564	Sept-06	164	4	119-159	857840.25	733574.99	1223.16
MW-107	72040	906992	May-07	165	4	110-160	858730.48	735460.50	1225.32
MW-108	72041	907007	May-07	165	4	110-160	857895.39	732250.40	1219.14
MW-109	72042	907008	May-07	165	4	110-160	859346.07	732836.35	1220.18
MW-110	72043	908516	Feb-08	165	4	110-160	859956.50	733380.72	1222.89
MW-111	72044	908517	Feb-08	165	4	110-160	859580.62	735153.44	1224.99
MW-112	72045	908518	Feb-08	165	4	110-160	857923.04	736150.97	1229.14
MW-113	77401	913316	June-11	150	4	90-145	861613.69	732693.72	1219.10
MW-114	77402	913317	July-11	150	4	90-145	860496.21	734877.06	1223.76
MW-115	78961	222549	Sept-13	150	4	90-145	857280.76	733192.08	1222.97
MW-116	78962	222550	Aug-13	150	4	90-145	858427.63	734326.29	1227.05
MW-117	78963	222551	Aug-13	150	4	90-145	857903.73	734569.09	1225.38
MW-118	78964	222552	Sept-13	150	4	90-145	856966.48	734172.90	1230.61
MW-119S	78965	222553	Sept-13	150	4	90-145	857353.13	733623.68	1230.94
MW-119D	78966	222554	Oct-13	615	5	570-610	857368.29	733637.60	1231.25
EW-101	67517	211538	Mar-06	190	6	125-185	857665.44	734823.51	1224.50
G-2	65309	504101	April-83	250	6	150-250	856862.03	734936.70	1228.53
G-7	60685	524081	June-89	250	8	150-250	857369.25	735290.06	1232.43
G-8	60683	524082	June-89	250	8	150-250	857407.30	735885.70	1232.41
G-9	60682	539953	Jan-94	225	6	140-225	858575.03	733527.53	1222.55
G-10	60681	539954	Jan-94	250	8	150-250	857362.03	734441.70	1230.45
R-1	76821	595204	Jan-04	295	10.75	180-290	858018.17	729488.77	1214.94

Notes:

[a] *Arizona Department of Water Resources (ADWR) numbers*

[b] *Northing and Easting based on modified state plane coordinates using the North American Datum of 1983 (NAD 83). Reference point used is benchmark G.D.A.C.S. Pt. #22039-1.*

ft bls = Feet below land surface

ft amsl = Feet above mean sea level

Well locations and measuring points re-surveyed by Starlink Surveying in July 2011.

Well locations and measuring points for MW-115 through MW-119D and R-1 surveyed by Starlink Surveying in October 2013.

Wells MW-101 and MW-103 modified with plastic caps in August 2011 to prevent venting from Air Sparge wells.
MW-101 raised 2 inches. MW-103 raised 7.125 inches.

TABLE 2
Former Unichem Facility
Soil Analytical Results
Cooper and Commerce WQARF Site

		trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene	Tetrachloroethene	Vinyl Chloride	Cyanide, Total	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Silver	Thallium	Zinc	Mercury
Sample ID	**Date**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
NRSRL	**---**	**230**	**150**	**23**	**13**	**---**	**12,000**	**409**	**10**	**11**	**450**	**65**	**41,000**	**800**	**20,400**	**5,100**	**5,100**	**67**	**307,000**	**307**
RSRL	**---**	**69**	**43**	**11**	**0.51**	**0.085**	**1,200**	**31**	**10**	**0.14**	**37**	**31**	**3,100**	**400**	**1,600**	**390**	**390**	**5.2**	**23,000**	**23**
GPL	**---**	**9.2**	**5.3**	**0.76**	**0.80**	**NE**	**1172**^{a,b}	**35**	**290**	**23**	**29**	**590**^{c}	**7615**^{a}	**290**	**590**	**290**	**586**^{a}	**12**	**29290**^{a}	**12**
AS/SVE-101-60	4/18/2006	<0.050	<0.050	<0.050	0.22	<0.50	<1.0	<5.0	5.4	<1.0	<1.0	11	11	<5.0	8.6	<5.0	<5.0	<5.0	6.5	<0.083
AS/SVE-101-70	4/18/2006	<0.050	<0.050	<0.050	0.11	<0.50	<1.0	<5.0	9.9	<1.0	<1.0	12	11	<5.0	15	<5.0	<5.0	<5.0	25	<0.083
AS/SVE-102-60	4/20/2006	<0.050	<0.050	<0.050	0.42	<0.50	<1.0	<5.0	8.8	<1.0	<1.0	15	18	<5.0	16	<5.0	<5.0	<5.0	44	<0.083
AS/SVE-102-70	4/20/2006	<0.050	<0.050	<0.050	0.46	<0.50	<1.0	<5.0	**11**	<1.0	<1.0	15	12	<5.0	21	<5.0	<5.0	<5.0	31	<0.083
SS-01-01	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	8.6	13	<5.0	10	<5.0	<5.0	<5.0	15	<0.083
SS-01-05	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	5.4	<1.0	<1.0	8.8	13	<5.0	10	<5.0	<5.0	<5.0	17	<0.083
SS-01-10	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	8.8	15	6.8	13	<5.0	<5.0	<5.0	27	<0.083
SS-02-01	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	9.5	140	8.6	12	<5.30	<5.0	<5.0	31	<0.083
SS-02-05	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	8.7	<1.0	<1.0	8.6	15	<5.0	10	<5.0	<5.0	<5.0	7.5	<0.083
SS-02-10	4/13/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	8.5	14	<5.0	11	<5.0	<5.0	<5.0	26	<0.083
SS-03-01	3/31/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	<5.0	<1.0	<1.0	12	16	<5.0	13	<5.0	<5.0	<5.0	28	<0.083
SS-03-05	3/31/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	<5.0	<1.0	<1.0	12	11	<5.0	12	<5.0	<5.0	<5.0	25	<0.083
SS-03-10	3/31/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	5.4	<1.0	<1.0	14	16	<5.0	17	<5.0	<5.0	<5.0	37	<0.083
SS-04-01	3/30/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	<5.0	<1.0	<1.0	12	15	<5.0	11	<5.0	<5.0	<5.0	30	<0.083
SS-04-05	3/30/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	5.8	<1.0	<1.0	16	15	<5.0	14	<5.0	<5.0	<5.0	33	<0.083
SS-04-10	3/31/2006	<0.10	<0.10	<0.10	<0.10	<0.50	0.5	<5.0	<5.0	<1.0	<1.0	16	18	<5.0	17	<5.0	<5.0	<5.0	39	<0.083
SS-05-01	4/12/2006	<0.10	<0.10	<0.10	0.11	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	7.9	11	<5.0	9.4	<5.0	<5.0	<5.0	13	<0.083
SS-05-05	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	9.1	18	6	13	<5.0	<5.0	<5.0	24	<0.083
SS-05-10	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	8.9	12	5.6	12	<5.0	<5.0	<5.0	28	<0.083
SS-06-01	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	6.9	14	<5.0	8.4	<5.0	<5.0	<5.0	19	<0.083
SS-06-05	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	13	23	<5.0	16	<5.0	<5.0	<5.0	41	<0.083
SS-06-10	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	4.0	<5.0	<5.0	<1.0	<1.0	8.8	11	<5.0	9.5	<5.0	<5.0	<5.0	21	<0.083
SS-08-01	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<1.0	<5.0	<5.0	<1.0	<1.0	9.5	22	<5.0	11	<5.0	<5.0	<5.0	24	<0.083
SS-08-05	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<1.0	<5.0	<5.0	<1.0	<1.0	7.8	10	6.2	10	<5.0	<5.0	<5.0	26	<0.083
SS-08-10	4/11/2006	<0.10	<0.10	<0.10	0.12	NS	<1.0	<5.0	5.1	<1.0	<1.0	12	14	<5.0	12	<5.0	<5.0	<5.0	110	<0.083
SS-08-10 DUP	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<1.0	<5.0	5.5	<1.0	<1.0	11	13	<5.0	11	<5.0	<5.0	<5.0	20	<0.083
SS-09-01	4/10/2006	<1.0	<1.0	<1.0	**2.8**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SS-09-05	4/11/2006	<0.1	<0.1	<0.1	<0.1	NS	<1.0	<5.0	6.2	<1.0	<1.0	16	18	<5.0	17	<5.0	<5.0	<5.0	27	<0.083
SS-09-10	4/11/2006	<0.1	<0.1	<0.1	<0.1	NS	<1.0	<5.0	<5.0	<1.0	<1.0	7.1	9.9	<5.0	9.1	<5.0	<5.0	<5.0	23	<0.083
SS-10-01	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<1.0	<5.0	<5.0	<1.0	<1.0	10	13	<5.0	11	<5.0	<5.0	<5.0	20	<0.083
SS-10-05	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<0.13	<5.0	<5.0	<1.0	<1.0	11	17	<5.0	14	<5.0	<5.0	<5.0	29	<0.083
SS-10-10	4/11/2006	<0.10	<0.10	<0.10	<0.10	NS	<0.13	<5.0	<5.0	<1.0	<1.0	9.2	12	<5.0	11	<5.0	<5.0	<5.0	27	<0.083
SS-11-01	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	9.7	12	<5.0	11	<5.0	<5.0	<5.0	15	<0.083
SS-11-05	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	8.8	<1.0	<1.0	9.8	17	5.8	14	<5.0	<56.0	<5.0	31	<0.083
SS-11-10	4/12/2006	<0.10	<0.10	<0.10	<0.10	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	8.5	11	<5.0	9.7	<5.0	<5.0	<5.0	21	<0.083
SS-12-01	4/7/2006	<1.0	<1.0	<1.0	0.32	NS	<1.0	<5.0	<5.0	<1.0	<1.0	8.7	18	<5.0	11					
SS-12-05	4/7/2006	<0.1	<0.1	<0.1	0.36	NS	<1.0	<5.0	<5.0	<1.0	<1.0	11	19	5.7	16	<5.0	<5.0	<5.0	32	<0.083
SS-12-10	4/7/2006	<0.10	<0.10	<0.10	**0.78**	NS	<1.0	5.5	<1.0	<1.0	<1.0	13	14	<5.0	13	<5.0	<5.0	<5.0	29	<0.083
SS-13-01	4/6/2006	<1.0	<1.0	<1.0	0.21	<0.50	<1.0	<0.50	<0.50	<1.0	<1.0	6.6	110	<5.0	11	<5.0	<5.0	<5.0	25	<0.083
SS-13-05	4/6/2006	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<0.50	6.1	<1.0	<1.0	10	18	<5.0	14	<5.0	<5.0	<5.0	22	<0.083
SS-13-10	4/6/2006	<1.0	<1.0	<1.0	**91**	<0.50	<1.0	<0.50	6.5	<1.0	<1.0	13	16	<5.0	14	<5.0	<5.0	<5.0	30	<0.083
SS-14-01	4/6/2006	<1.0	<1.0	<1.0	0.11	<0.50	<1.0	<0.50	<0.50	<1.0	<1.0	8.8	13	<5.0	11	<5.0	<5.0	<5.0	21	<0.083
SS-14-05	4/6/2006	<1.0	<1.0	<1.0	0.38	<0.50	<1.0	<0.50	<0.50	<1.0	<1.0	7.1	13	<5.0	10	<5.0	<5.0	<5.0	6.1	<0.083
SS-14-10	4/6/2006	<1.0	<1.0	<1.0	0.23	<0.50	<1.0	<0.50	<0.50	<1.0	<1.0	6.2	8.4	<5.0	8.0	<5.0	<5.0	<5.0	20	<0.083
SS-15-01	4/7/2006	<1.0	<1.0	<1.0	0.43	NS	<1.0	<0.50	<0.50	<1.0	<1.0	9.2	190	<5.0	12	<5.0	<5.0	<5.0	13	<0.083
SS-15-05	4/7/2006	<10	<10	<10	**300**	NS	<1.0	<5.0	5.6	<1.0	<1.0	9.8	240	5.3	14	<5.0	<5.0	<5.0	31	<0.083
SS-15-10	4/7/2006	<50	<50	<50	**1900**	NS	<1.0	<5.0	<5.0	<1.0	<1.0	11	110	<5.0	15	<5.0	<5.0	<5.0	34	<0.083
VP-101-60	4/14/2006	<0.050	<0.050	<0.050	0.13	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	12	9.5	<5.0	8.6	<5.0	<5.0	<5.0	7.8	<0.083
VP-101-60 DUP	4/14/2006	<0.050	<0.050	<0.050	0.17	<0.50	<0.13	<5.0	<5.0	<1.0	<1.0	13	9.9	<5.0	10	<5.0	<5.0	<5.0	20	<0.083
VP-102-10	4/4/2006	<1.0	<1.0	<1.0	0.15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-20	4/5/2006	<1.0	<1.0	<1.0	0.12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-30	4/5/2006	<1.0	<1.0	<1.0	0.43	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-40	4/5/2006	<1.0	<1.0	<1.0	**0.79**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-50	4/5/2006	<1.0	<1.0	<1.0	0.15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-60	4/5/2006	<1.0	<1.0	<1.0	**0.93**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-102-70	4/5/2006	<1.0	<1.0	<1.0	**1.1**	<0.50	<1.0	<0.50	**11**	<1.0	<1.0	7.5	12	<5.0	28	<5.0	<5.0	<5.0	23	<0.083
VP-103-10	4/10/2006	<1.0	<1.0	<1.0	0.16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-103-20	4/10/2006	<0.1	<0.1	<0.1	**11**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-103-30	4/10/2006	<0.1	<0.1	<0.1	**1.3**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-103-40	4/10/2006	<0.1	<0.1	<0.1	**1.3**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 2
Former Unichem Facility
Soil Analytical Results
Cooper and Commerce WQARF Site

		trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene	Tetrachloroethene	Vinyl Chloride	Cyanide, Total	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Silver	Thallium	Zinc	Mercury
Sample ID	**Date**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
NRSRL	**---**	**230**	**150**	**23**	**13**	**---**	**12,000**	**409**	**10**	**11**	**450**	**65**	**41,000**	**800**	**20,400**	**5,100**	**5,100**	**67**	**307,000**	**307**
RSRL	**---**	**69**	**43**	**11**	**0.51**	**0.085**	**1,200**	**31**	**10**	**0.14**	**37**	**31**	**3,100**	**400**	**1,600**	**390**	**390**	**5.2**	**23,000**	**23**
GPL	**---**	**9.2**	**5.3**	**0.76**	**0.80**	**NE**	**1172**^{a,b}	**35**	**290**	**23**	**29**	**590**^{c}	**7615**^{a}	**290**	**590**	**290**	**586**^{a}	**12**	**29290**^{a}	**12**
VP-103-50	4/10/2006	<0.1	<0.1	<0.1	0.41	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-103-60	4/10/2006	<0.1	<0.1	<0.1	**1.30**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VP-103-70	4/10/2006	<0.1	<0.1	<0.1	**2.0**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-5	11/15/2010	<0.045	<0.045	<0.045	<0.045	<0.446	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-10	11/15/2010	<0.044	<0.044	<0.044	<0.044	<0.435	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-10 DUP	11/15/2010	<0.042	<0.042	<0.042	<0.042	<0.420	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-20	11/15/2010	<0.045	<0.045	<0.045	**0.458**	<0.446	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-30	11/15/2010	<0.061	<0.061	<0.061	**3.76**	<0.606	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-40	11/15/2010	<0.059	<0.059	<0.059	**4.78**	<0.589	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SVE-105-50	11/15/2010	<0.048	<0.048	<0.048	**0.116**	<0.476	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-10	6/4/2012	<0.12	<0.12	<0.12	<0.12	<0.30	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-20	6/4/2012	<0.16	<0.16	<0.16	<0.16	<0.39	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-30	6/4/2012	<0.13	<0.13	<0.13	<0.13	<0.31	NS	<5.0	**77**	**1.4**	<0.5	20	**15,000**	14	21	<0.5	<2.5	<5.0	71	<0.10
B-1W-40	6/4/2012	<0.10	<0.10	<0.10	<0.10	<0.25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-50	6/4/2012	<0.10	<0.10	<0.10	<0.10	<0.25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-60	6/5/2012	<0.10	<0.10	<0.10	**170**	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-70	6/5/2012	<0.10	<0.10	<0.10	**3,900**	<0.25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-1W-70 DUP	6/5/2012	<0.10	<0.10	<0.10	**4,800**	<0.25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-10	6/5/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-20	6/5/2012	<0.13	<0.13	<0.13	<0.13	<0.065	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-30	6/5/2012	<0.12	<0.12	<0.12	<0.12	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-40	6/5/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-50	6/5/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-60	6/5/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-70	6/6/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-2ESE-74.4	6/6/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-10	6/6/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-20	6/6/2012	<0.12	<0.12	<0.12	<0.12	<0.059	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-30	6/6/2012	<0.12	<0.12	<0.12	<0.12	<0.06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-40	6/6/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-50	6/6/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-60	6/7/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-70	6/7/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-74.5	6/7/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-3NE-74.5 DUP	6/7/2012	<0.10	<0.10	<0.10	<0.10	<0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: *Bolded Numbers Exceed RSRL.*
NRSRL = Non-Residential Soil Remediation Level
RSRL = Residential Soil Remediation Level
GPL = Groundwater Protection Level
NE = None established
[a] *= GPL calculated using method for inorganic constituents detailed in September 1996 ADEQ guidance*
[b] *= GPL calculated using AWQS for free cyanide*
[c] *= GPL for for total chromium*
mg/kg = Milligrams per kilogram
NS = Not Sampled

TABLE 3
Soil Vapor Analytical Results for Shallow Borings at Former Unichem Facility
Cooper and Commerce WQARF Site

Well ID	Depth (ft bls)	Date	***trans*-DCE**		***cis*-DCE**		**TCE**		**PCE**	
			mg/m^3	**ppmv**	**mg/m^3**	**ppmv**	**mg/m^3**	**ppmv**	**mg/m^3**	**ppmv**
SS-1	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/13/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	28	4.05
	10	4/13/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	25	3.61
SS-2	2	4/13/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	22	3.24
	5		NS	NS	NS	NS	NS	NS	NS	NS
	10	4/13/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	54	7.95
SS-3	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	3/31/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	18	2.61
	10	3/31/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	24	3.56
SS-4	1	3/30/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	3.8	0.56
	5	3/30/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	2.8	0.41
	10	3/31/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	17	2.5
SS-5	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/12/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	380	55.3
	10	4/12/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	48	7.02
SS-6	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/12/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	45	6.63
	10	4/12/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	280	41.24
SS-7	1	3/30/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	<1.0	<0.15
	5	3/30/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	<1.0	<0.15
	10	3/30/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	<1.0	<0.15
SS-8	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/11/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	80	11.85
	10	4/11/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	27	3.91
SS-9	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/11/2006	<5	<1.25	<5	<1.25	<5	<0.95	57	8.46
	10	4/11/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	52 (51)	7.61 (7.46)
SS-10	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/11/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	140	20.05
	10	4/11/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	27	5.26
SS-11	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/12/2006	<2.0	NR	<2.0	NR	<2.0	NR	35	NR
	10	4/12/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	41	6.05
SS-12	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/7/2006	<200	<50	<200	<50	<200	<38	2500	367.25
	10	4/7/2006	<20	<5.0	<20	<5.0	<20	<3.8	3300	484.17
SS-13	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/6/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	85	12.57
	10	4/6/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	61	9.02
SS-14	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/6/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	41	5.97
	10	4/6/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	68	10
SS-15	1		NS	NS	NS	NS	NS	NS	NS	NS
	5	4/7/2006	<50	<12.5	<50	<12.5	<50	<9.5	9800	1441.5
	10	4/7/2006	<200	<50	<200	<50	<200	<38	29000	4256.4

Notes: *Values in parenthesis indicate duplicate sample.*
trans-DCE = trans-1,2-dichloroethane
cis-DCE = cis-1,2-dichloroethane
PCE = Tetrachloroethene
TCE = Trichloroethene
mg/m^3 = Miligrams per cubic meter
ppmv = Parts per million - volume
ft bls = Feet below land surface
NS = Not Sampled
NR = Value not reported

TABLE 4
Soil Vapor Analytical Results for Deep Borings at Former Unichem Facility
Cooper and Commerce WQARF Site

Boring ID	Depth (ft bls)	Date	*trans*-DCE		*cis*-DCE		TCE		PCE	
			mg/m^3	ppmv	mg/m^3	ppmv	mg/m^3	ppmv	mg/m^3	ppmv
AS/SVE-101	10	4/18/2006	<2.0	<0.50	<2.0	<0.50	<2.0	<0.38	170	24.61
	20	4/18/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	66	9.65
	30	4/18/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	110	15.85
	40	4/18/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	130	19.05
	40 (D)	4/18/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	110	16.94
	50	4/18/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	81	11.91
AS/SVE-102	10	4/20/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	110	16.39
	20	4/20/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	260	38.07
	30	4/20/2006	<20	<5.0	<20	<5.0	<20	<3.8	490	71.47
	40	4/20/2006	<20	<5.0	<20	<5.0	<20	<3.8	560	83.06
	50	4/20/2006	<50	<12.5	<50	<12.5	<50	<9.5	1400	212.87
	60	4/20/2006	<200	<50	<200	<50	<200	<38	7400	1083.4
VP-101	10	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	97	14.26
	20	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	76	11.26
	30	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	96	14.07
	40	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	91	13.41
	50	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	91	13.41
	60	4/14/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	1800	272.02
VP-102	10	4/4/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	35	5.1
	20	4/5/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	20	3
	30	4/5/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	38	5.55
	40	4/5/2006	<1.0	<0.25	<1.0	<0.25	<1.0	<0.19	72	10.59
	50	4/5/2006	NS	NS	NS	NS	NS	NS	NS	NS
	60	4/5/2006	<1.0	<0.25	<1.0	<0.25	14	2.56	1500	220.34
	70	4/5/2006	<1.0	<0.25	<1.0	<0.25	11	2.02	1600	241.49
VP-103	10	4/10/2006	<50	<12.5	<50	<12.5	<50	<9.5	540	79.33
	20	4/10/2006	<5.0	<1.25	<5.0	<1.25	<5.0	<0.95	200	29.19
	30	4/10/2006	<20	<5.0	<20	<5.0	<20	<3.8	430	62.8
	40	4/10/2006	<50	<12.5	<50	<12.5	<50	<9.5	1800	270.48
	50	4/10/2006	<100	<25	<100	<25	<100	<19	3800	562.16
	60	4/10/2006	<1000	<250	<1000	<250	<1000	<190	14000	1996
	70	4/10/2006	<100	<25	<100	<25	<100	<19	1500	228.26
B-1W	10	6/4/2012	NA	NA	NA	NA	0.0392	0.0073	0.400	0.059
	20	6/4/2012	NA	NA	NA	NA	<0.0134	<0.0025	0.515	0.076
	30	6/4/2012	NA	NA	NA	NA	<0.0537	<0.010	0.400	0.059
	40	6/4/2012	NA	NA	NA	NA	0.0134	<0.0025	0.017	<0.0025
	50	6/4/2012	NA	NA	NA	NA	0.014	0.0026	0.685	0.101
	60	6/5/2012	NA	NA	NA	NA	<5.37	<1.0	237	35
	70	6/5/2012	NA	NA	NA	NA	<13.4	<2.5	2370	350
B-2ESE	10	6/5/2012	NA	NA	NA	NA	<0.0537	<0.01	9.49	1.4
	20	6/5/2012	NA	NA	NA	NA	<0.0537	<0.01	2.17	0.32
	30	6/5/2012	NA	NA	NA	NA	<0.00537	<0.001	0.0149	0.0022
	40	6/5/2012	NA	NA	NA	NA	<0.0134	<0.0025	0.129	0.019
	50	6/5/2012	NA	NA	NA	NA	<0.0134	<0.0025	0.136	0.02
	60	6/5/2012	NA	NA	NA	NA	<0.0134	<0.0025	0.0678	0.01
	70	6/6/2012	NA	NA	NA	NA	<0.0134	<0.0025	0.0359	0.0053
	74.4	6/6/2012	NA	NA	NA	NA	<0.00537	<0.001	<0.00678	<0.001
B-3NE	10	6/6/2012	NA	NA	NA	NA	<0.134	<0.0025	0.176	0.026
	20	6/6/2012	NA	NA	NA	NA	<0.134	<0.0025	0.0814	0.012
	30	6/6/2012	NA	NA	NA	NA	<0.134	<0.0025	<0.017	<0.0025
	40	6/6/2012	NA	NA	NA	NA	<0.134	<0.0025	0.0414	0.0061
	50	6/6/2012	NA	NA	NA	NA	<0.134	<0.0025	0.0244	0.0036
	60	6/7/2012	NA	NA	NA	NA	<0.134	<0.0025	<0.017	<0.0025
	70	6/7/2012	NA	NA	NA	NA	<0.134	<0.0025	<0.017	<0.0025
	74.5	6/7/2012	NA	NA	NA	NA	<0.134	<0.0025	<0.017	<0.0025

Notes:

(D) = duplicate sample.
trans-DCE = trans-1,2-dichloroethane
cis-DCE = cis-1,2-dichloroethane
PCE = Tetrachloroethene
TCE = Trichloroethene
mg/m^3 = Miligrams per cubic meter
ppmv = Parts per million - volume
ft bls = Feet below land surface
NS = Not Sampled
NA = Not Analyzed

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	G-7		G-8		G-9		G-10		EW-101		MW-101		MW-102	
	Measuring Point Elevation: 1230.89 Prior to July, 2011		Measuring Point Elevation: 1230.47 Prior to July, 2011		Measuring Point Elevation: 1220.63 Prior to July, 2011		Measuring Point Elevation: 1228.60 Prior to July, 2011		Measuring Point Elevation: 1221.46[1] Prior to July, 2011		Measuring Point Elevation: 1224.21 Prior to July, 2011		Measuring Point Elevation: 1224.87 Prior to July, 2011	
	Measuring Point Elevation: 1232.43 After July, 2011		Measuring Point Elevation: 1232.41 After July, 2011		Measuring Point Elevation: 1222.55 After July, 2011		Measuring Point Elevation: 1230.45 After July, 2011		Measuring Point Elevation: 1224.50 After July, 2011		Measuring Point Elevation: 1226.20 [2] After August, 2011		Measuring Point Elevation: 1228.32 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
1/27/95	No Data Available		No Data Available		No Data Available	No Data Available	No Data Available		Well installed March 2006		126.26	1097.95	126.17	1098.70
3/22/95											123.96	1100.25	123.51	1101.36
7/17/95											124.70	1099.51	124.61	1100.26
10/26/95											122.12	1102.09	122.04	1102.83
1/29/96											119.31	1104.90	119.12	1105.75
4/30/96											120.25	1103.96	119.75	1105.12
7/23/96											119.53	1104.68	120.76	1104.11
10/25/96											121.64	1102.57	120.97	1103.90
1/1/01					118.3	1102.33					No Data Available		No Data Available	
2/1/01					117.5	1103.13								
3/1/01					116.4	1104.23								
4/1/01					118.4	1102.23								
5/1/01					119.9	1100.73								
6/1/01					122.2	1098.43								
7/1/01					124.9	1095.73								
8/1/01					126.0	1094.63								
9/1/01					124.3	1096.33								
10/1/01					122.3	1098.33								
11/1/01					120.9	1099.73								
12/1/01					119.9	1100.73								
1/22/02					118.2	1102.43					NM Well Damaged		122.09	1102.78
2/1/02					118.7	1101.93							No Data Available	
3/1/02					120.2	1100.43								
4/1/02					120.9	1099.73								
5/1/02					123.0	1097.63								
6/1/02					124.6	1096.03								
7/1/02					126.1	1094.53								
8/1/02					127.9	1092.73								
9/1/02					128.6	1092.03								
10/1/02					128.6	1092.03								
11/1/02					127.3	1093.33								
12/1/02					125.3	1095.33								
1/1/03					124.2	1096.43								
2/1/03					123.9	1096.73								
3/1/03					124.9	1095.73								
4/1/03					126.6	1094.03								
5/1/03					129.0	1091.63								
7/1/2003					132.1	1088.53								
8/7/03					132.8	1087.83								
9/4/03					134.6	1086.03								
10/1/03					135.2	1085.43								
11/1/03					134.2	1086.43								
12/8/03					132.0	1088.63								
1/1/04					130.6	1090.03								
2/1/04					130.0	1090.63								
3/10/04					129.0	1091.63								
4/1/04					128.8	1091.83								
5/1/04					131.6	1089.03								
6/4/04					135.1	1085.53								
7/1/04					134.0	1086.63								
8/1/04					135.4	1085.23								
9/20/04					136.3	1084.33								
10/1/04					135.1	1085.53								
11/1/04					133.1	1087.53								
12/8/04					132.7	1087.93								
1/31/05					131.1	1089.53								
2/28/05					128.9	1091.73								
3/28/2005	135.6	1095.29	137.0	1093.47	129.7	1090.93	134.0	1094.60					131.79	1093.08
4/26/2005	137.57	1093.32	137.29	1093.18	129.27	1091.36	137.77	1090.83					131.90	1092.97
5/23/2005	137.15	1093.74	136.70	1093.77	128.25	1092.38	135.15	1093.45					131.53	1093.34
6/17/2005	136.81	1094.08	138.62	1091.85	127.55	1093.08	134.37	1094.23					131.01	1093.86
7/26/2005	136.11	1094.78	135.37	1095.10	126.81	1093.82	134.11	1094.49					130.22	1094.65
8/10/2005	135.53	1095.36	135.02	1095.45	126.22	1094.41	133.49	1095.11					129.60	1095.27
9/13/2005	134.38	1096.51	133.66	1096.81	124.70	1095.93	132.42	1096.18					128.48	1096.39

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	G-7		G-8		G-9		G-10		EW-101		MW-101		MW-102	
	Measuring Point Elevation: 1230.89 Prior to July, 2011		Measuring Point Elevation: 1230.47 Prior to July, 2011		Measuring Point Elevation: 1220.63 Prior to July, 2011		Measuring Point Elevation: 1228.60 Prior to July, 2011		Measuring Point Elevation: 1221.46[1] Prior to July, 2011		Measuring Point Elevation: 1224.21 Prior to July, 2011		Measuring Point Elevation: 1224.87 Prior to July, 2011	
	Measuring Point Elevation: 1232.43 After July, 2011		Measuring Point Elevation: 1232.41 After July, 2011		Measuring Point Elevation: 1222.55 After July, 2011		Measuring Point Elevation: 1230.45 After July, 2011		Measuring Point Elevation: 1224.50 After July, 2011		Measuring Point Elevation: 1226.20 [2] After August, 2011		Measuring Point Elevation: 1228.32 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
10/11/2005	133.37	1097.52	132.87	1097.60	123.72	1096.91	131.32	1097.28	Well Installed March 2006		NM Well Damaged		127.32	1097.55
11/18/2005	132.48	1098.41	132.02	1098.45	122.91	1097.72	130.52	1098.08					126.56	1098.31
12/19/2005	132.00	1098.89	131.50	1098.97	122.40	1098.23	130.10	1098.50					126.17	1098.70
1/18/2006	131.65	1099.24	132.30	1098.17	121.83	1098.80	129.55	1099.05					125.56	1099.31
2/14/2006	131.15	1099.74	130.65	1099.82	121.62	1099.01	129.17	1099.43					125.26	1099.61
3/31/2006	129.62	1101.27	130.60	1099.87	120.45	1100.18	127.70	1100.90					123.87	1101.00
4/19/2006	129.22	1101.67			119.58	1101.05	127.21	1101.39	122.34	1101.58			123.27	1101.60
5/25/2006	132.20	1098.69	127.99	1102.48	118.73	1101.90	126.45	1102.15	121.67	1102.25	121.91	1102.30	124.23	1100.64
6/21/2006	127.87	1103.02	127.51	1102.96	118.27	1102.36	123.86	1104.74	121.16	1102.76	121.47	1102.74	122.10	1102.77
7/21/2006	127.71	1103.18	127.16	1103.31	118.02	1102.61	125.68	1102.92	120.81	1103.11	120.98	1103.23	121.69	1103.18
8/24/2006	126.65	1104.24	125.97	1104.50	116.88	1103.75	124.55	1104.05	119.80	1104.12	120.04	1104.17	120.60	1104.27
9/22/2006	125.82	1105.07	125.30	1105.17	116.10	1104.53	126.61	1101.99	119.13	1104.79	119.32	1104.89	119.96	1104.91
10/20/2006	125.48	1105.41	125.87	1104.60	115.50	1105.13	123.44	1105.16	118.56	1105.36	118.82	1105.39	119.44	1105.43
11/21/2006	124.96	1105.93	124.55	1105.92	115.16	1105.47	122.83	1105.77	118.30	1105.62	118.46	1105.75	119.03	1105.84
12/11/2006	125.82	1105.07	124.62	1105.85	115.01	1105.62	123.17	1105.43	117.85	1106.07	118.18	1106.03	118.77	1106.10
1/25/2007	124.31	1106.58	123.78	1106.69	114.64	1105.99	122.68	1105.92	117.48	1106.44	117.71	1106.50	117.42	1107.45
2/21/2007	123.48	1107.41	123.25	1107.22	114.33	1106.30	122.01	1106.59	116.82	1107.10	117.01	1107.20	117.65	1107.22
3/22/2007	124.01	1106.88	123.83	1106.64	114.91	1105.72	123.02	1105.58	117.15	1106.77	117.28	1106.93	117.93	1106.94
4/12/2007	125.48	1105.41	125.02	1105.45	116.75	1103.88	125.07	1103.53	119.19	1104.73	119.28	1104.93	120.03	1104.84
5/23/2007	128.85	1102.04	128.00	1102.47	119.90	1100.73	128.32	1100.28	122.38	1101.54	122.56	1101.65	123.28	1101.59
6/4/2007	129.50	1101.39	128.71	1101.76	120.65	1099.98	128.96	1099.64	123.10	1100.82	123.25	1100.96	123.92	1100.95
7/13/2007			127.32	1103.15	119.54	1101.09	126.83	1101.77	121.25	1102.67	121.47	1102.74	122.14	1102.73
8/21/2007	127.45	1103.44	126.94	1103.53	118.47	1102.16	126.31	1102.29	120.44	1103.48	120.96	1103.25	121.62	1103.25
9/17/2007	127.23	1103.66	126.71	1103.76	118.06	1102.57	125.99	1102.61	120.42	1103.50	120.68	1103.53	121.31	1103.56
10/11/2007	126.90	1103.99	126.54	1103.93	117.69	1102.94	125.47	1103.13	120.21	1103.71	120.43	1103.78	121.07	1103.80
11/7/2007	126.90	1103.99	126.38	1104.09	117.65	1102.98	125.82	1102.78	120.15	1103.77	120.38	1103.83	121.04	1103.83
12/10/2007	128.04	1102.85	125.92	1104.55	117.19	1103.44	125.02	1103.58	119.39	1104.53	119.61	1104.60	119.26	1105.61
1/31/2008	125.70	1105.19	125.34	1105.13	116.62	1104.01	124.72	1103.88	119.01	1104.91	119.12	1105.09	119.75	1105.12
2/27/2008	124.70	1106.19	124.15	1106.32	115.54	1105.09	123.65	1104.95	117.96	1105.96	117.74	1106.47	118.62	1106.25
3/17/2008	125.25	1105.64	124.03	1106.44	115.30	1105.33	123.44	1105.16	117.39	1106.53	117.65	1106.56	117.72	1107.15
4/16/2008	123.77	1107.12	123.48	1106.99	114.60	1106.03	122.94	1105.66	117.11	1106.81	117.33	1106.88	118.02	1106.85
5/21/2008	123.04	1107.85	122.70	1107.77	113.82	1106.81	123.39	1105.21	116.46	1107.46	116.60	1107.61	117.34	1107.53
6/2/2008	123.06	1107.83	122.57	1107.90	113.58	1107.05	122.10	1106.50	113.68	1107.78	116.20	1108.01	116.98	1107.89
6/18/2008	122.35	1108.54	122.21	1108.26	113.17	1107.46	121.67	1106.93	113.44	1108.02	116.12	1108.09	116.80	1108.07
7/23/2008	121.83	1109.06	121.66	1108.81	112.41	1108.22	121.18	1107.42			115.54	1108.67	116.21	1108.66
8/21/2008	121.35	1109.54	121.60	1108.87	112.80	1107.83	120.56	1108.04	112.20	1109.26	115.01	1109.20	115.55	1109.32
9/9/2008	121.00	1109.89	120.80	1109.67	111.40	1109.23	120.25	1108.35	111.90	1109.56	114.65	1109.56	116.95	1107.92
10/15/2008	120.50	1110.39	120.35	1110.12	110.88	1109.75	119.78	1108.82	111.57	1109.89	114.15	1110.06	116.56	1108.31
11/19/2008	120.02	1110.87	119.77	1110.70	110.40	1110.23	119.24	1109.36	111.06	1110.40	113.65	1110.56	114.29	1110.58
12/9/2008	119.91	1110.98	119.70	1110.77	110.30	1110.33	119.08	1109.52	110.70	1110.76	113.40	1110.81	114.03	1110.84
5/28/2010	113.29	1117.60	113.03	1117.44	110.00	1110.63	112.54	1116.06	NM		106.99	1117.22	108.66	1116.21
6/30/2010	112.66	1118.23	NM		NM		112.11	1116.49	NM		NM		NM	
8/31/2010	112.39	1118.50	NM		NM		111.58	1117.02	NM		106.08	1118.13	106.81	1118.06
9/22/2010	111.90	1118.99	NM		NM		111.12	1117.48	NM		105.61	1118.60	106.27	1118.60
10/18/2010	111.33	1119.56	111.06	1119.41	101.45	1119.18	110.51	1118.09	122.00	1099.46	104.99	1119.22	105.65	1119.22
11/18/2010	111.45	1119.44	NM		NM		110.10	1118.50	110.00	1111.46	104.56	1119.65	105.18	1119.69
12/29/2010	110.21	1120.68	NM		NM		109.39	1119.21	107.00	1114.46	103.90	1120.31	104.50	1120.37
1/31/2011	109.95	1120.94	NM		NM		109.09	1119.51	101.98	1119.48	103.51	1120.70	104.16	1120.71
2/25/2011	109.91	1120.98	NM		NM		108.90	1119.70	119.35	1102.11	103.37	1120.84	104.03	1120.84
3/29/2011	109.15	1121.74	NM		NM		108.42	1120.18	119.30	1102.16	102.92	1121.29	103.59	1121.28
4/15/2011	108.93	1121.96	108.78	1121.69	99.38	1121.25	108.15	1120.45	117.15	1104.31	102.69	1121.52	103.28	1121.59
5/24/2011	108.63	1122.26	NM		NM		107.88	1120.72	114.07	1107.39	102.40	1121.81	103.08	1121.79
6/22/2011	109.10	1121.79	NM		NM		107.48	1121.12	113.57	1107.89	102.00	1122.21	102.62	1122.25
7/29/2011	117.85	1114.58	NM		NM		107.32	1123.13	116.00	1108.50	101.89	1124.14	104.20	1124.12
8/30/2011	108.23	1124.20	NM		NM		106.90	1123.55	116.05	1108.45	NM		103.76	1124.56
9/27/2011	107.25	1125.18	NM		97.71	1124.84	106.44	1124.01	113.21	1111.29	100.92	1125.11	103.30	1125.02
10/14/2011	106.88	1125.55	106.73	1125.68	97.47	1125.08	106.06	1124.39	111.47	1113.03	100.67	1125.53	102.93	1125.39
11/29/2011	108.50	1123.93	NM		NM		105.91	1124.54	98.81	1125.69	NM		102.68	1125.64
12/30/2011	105.67	1126.76	NM		NM		104.66	1125.79	97.75	1126.75	NM		101.44	1126.88
1/26/2012	105.97	1126.46	NM		NM		105.11	1125.34	98.03	1126.47	99.80	1126.40	102.04	1126.28
2/28/2012	105.80	1126.63	NM		NM		104.81	1125.64	97.77	1126.73	99.47	1126.73	101.62	1126.70
3/23/2012	105.66	1126.77	NM		NM		104.96	1125.49	122.30	1102.20	NM		101.86	1126.46
4/27/2012	107.53	1124.90	105.71	1126.70	96.41	1126.14	105.12	1125.33	122.18	1102.32	99.94	1126.26	102.03	1126.29
5/25/2012	106.25	1126.18	NM		NM		105.17	1125.28	116.24	1108.26	99.95	1126.25	102.11	1126.21

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	G-7		G-8		G-9		G-10		EW-101		MW-101		MW-102	
	Measuring Point Elevation: 1230.89 Prior to July, 2011		Measuring Point Elevation: 1230.47 Prior to July, 2011		Measuring Point Elevation: 1220.63 Prior to July, 2011		Measuring Point Elevation: 1228.60 Prior to July, 2011		Measuring Point Elevation: 1221.46[1] Prior to July, 2011		Measuring Point Elevation: 1224.21 Prior to July, 2011		Measuring Point Elevation: 1224.87 Prior to July, 2011	
	Measuring Point Elevation: 1232.43 After July, 2011		Measuring Point Elevation: 1232.41 After July, 2011		Measuring Point Elevation: 1222.55 After July, 2011		Measuring Point Elevation: 1230.45 After July, 2011		Measuring Point Elevation: 1224.50 After July, 2011		Measuring Point Elevation: 1226.20 [2] After August, 2011		Measuring Point Elevation: 1228.32 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
6/29/2012	107.15	1125.28	NM		NM		105.88	1124.57	119.26	1105.24	100.62	1125.58	102.78	1125.54
7/24/2012	107.27	1125.16	NM		NM		106.50	1123.95	99.40	1125.10	101.14	1125.06	103.30	1125.02
8/27/2012	108.35	1124.08	NM		NM		106.04	1124.41	100.15	1124.35	101.74	1124.46	103.90	1124.42
9/25/2012	108.30	1124.13	NM		NM		106.55	1123.90	120.05	1104.45	102.38	1123.82	104.55	1123.77
10/12/2012	108.70	1123.73	108.44	1123.97	96.64	1125.91	106.92	1123.53	119.96	1104.54	102.62	1123.58	104.75	1123.57
11/29/2012	109.18	1123.25	NM		NM		107.40	1123.05	115.94	1108.56	103.25	1122.95	105.40	1122.92
12/27/2012	109.39	1123.04	NM		NM		107.62	1122.83	101.84	1122.66	NM		105.50	1122.82
1/31/2013	109.48	1122.95	NM		NM		107.62	1122.83	115.80	1108.70	103.51	1122.69	105.67	1122.65
2/21/2013	109.58	1122.85	NM		NM		107.75	1122.70	116.10	1108.40	NM		105.86	1122.46
3/29/2013	109.86	1122.57	NM		NM		108.07	1122.38	116.15	1108.35	103.91	1122.29	106.06	1122.26
4/19/2013	110.20	1122.23	110.00	1122.41	101.45	1121.10	108.50	1121.95	113.90	1110.60	104.30	1121.90	106.14	1122.18
5/31/2013	110.86	1121.57	NM		NM		109.17	1121.28	116.50	1108.00	105.08	1121.12	107.16	1121.16
6/28/2013	111.24	1121.19	NM		NM		109.50	1120.95	NM		105.50	1120.70	107.58	1120.74
7/15/2013	111.81	1120.62	NM		NM		110.08	1120.37	NM		105.82	1120.38	107.99	1120.33
8/28/2013	112.28	1120.15	NM		NM		110.50	1119.95	NM		NM		108.50	1119.82
9/25/2013	112.49	1119.94	NM		NM		110.78	1119.67	NM		NM		108.77	1119.55
10/25/2013	113.10	1119.33	112.80	1119.61	104.40	1118.15	111.30	1119.15	116.25	1108.25	107.21	1118.99	109.23	1119.09
11/29/2013	113.18	1119.25	NM		NM		111.54	1118.91	116.55	1107.95	107.45	1118.75	109.56	1118.76
12/31/2013	113.33	1119.10	NM		NM		111.58	1118.87	116.30	1108.20	107.44	1118.76	109.60	1118.72
1/30/2014	113.30	1119.13	NM		NM		111.65	1118.80	117.05	1107.45	107.53	1118.67	109.70	1118.62
2/24/2014	113.45	1118.98	NM		NM		111.78	1118.67	116.19	1108.31	107.53	1118.67	109.72	1118.60
3/26/2014	113.50	1118.93	NM		NM		111.75	1118.70	116.43	1108.07	NM		109.69	1118.63
4/15/2014	112.60	1119.83	113.50	1118.91	104.20	1118.35	110.80	1119.65	NM		108.15	1118.05	109.69	1118.63
5/30/2014	114.60	1117.83	NM		NM		113.00	1117.45	119.61	1104.89	NM		110.97	1117.35
6/25/2014	115.14	1117.29	NM		NM		113.41	1117.04	106.99	1117.51	NM		111.22	1117.10
7/17/2014	115.90	1116.53	NM		NM		114.40	1116.05	NM		110.01	1116.19	112.21	1116.11
8/26/2014	116.89	1115.54	NM		NM		115.20	1115.25	123.40	1101.10	111.05	1115.15	113.23	1115.09
9/26/2014	115.98	1116.45	NM		NM		114.15	1116.30	120.20	1104.30	110.09	1116.11	112.25	1116.07
12/11/2014	NM		NM		NM		NM		NM		109.82	1116.38	110.25	1118.07
2/23/2015	NM		NM		NM		NM		NM		109.79	1116.41	110.15	1118.17

Depths to water for G-wells reflect the precision of measurements provided.
Surveyed measuring point elevations are updated as of 2006.
NM = Not measured

[1] During the construction of the remediation compound in July 2008, approximately 2.46 feet of casing was cut off the casing of EW-101. The new estimated well head elevation for EW-101 is 1221.46 ft amsl.

[2] MW-101 raised two inches in August 2011.

[3] Depth to water measurements for December 2014 and February 2015 taken by Geosyntec Consultants.

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-103		MW-104S		MW-104D		MW-105		MW-106		MW-107		MW-108	
	Measuring Point Elevation: 1224.36 Prior to July, 2011		Measuring Point Elevation: 1221.10 Prior to July, 2011		Measuring Point Elevation: 1221.58 Prior to July, 2011		Measuring Point Elevation: 1227.36 Prior to July, 2011		Measuring Point Elevation: 1221.36 Prior to July, 2011		Measuring Point Elevation: 1223.50 Prior to July, 2011		Measuring Point Elevation: 1217.30 Prior to July, 2011	
	Measuring Point Elevation: 1226.69 [4] After August, 2011		Measuring Point Elevation: 1222.98 After July, 2011		Measuring Point Elevation: 1223.42 After July, 2011		Measuring Point Elevation: 1229.11 After July, 2011		Measuring Point Elevation: 1223.16 After July, 2011		Measuring Point Elevation: 1225.32 After July, 2011		Measuring Point Elevation: 1219.14 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
1/27/95	125.02	1099.34	No Data Available	No Data Available	No Data Available	No Data Available	Well Installed June 2006		Well Installed September 2006		Well Installed May 2007		Well Installed May 2007	
3/22/95	122.92	1101.44												
7/17/95	123.60	1100.76												
10/26/95	120.87	1103.49												
1/29/96	118.49	1105.87												
4/30/96	119.28	1105.08												
7/23/96	119.62	1104.74												
10/25/96	120.61	1103.75												
1/1/01	No Data Available													
2/1/01														
3/1/01														
4/1/01														
5/1/01														
6/1/01														
7/1/01														
8/1/01														
9/1/01														
10/1/01														
11/1/01														
12/1/01														
1/22/02	121.43	1102.93												
2/1/02	No Data Available													
3/1/02														
4/1/02														
5/1/02														
6/1/02														
7/1/02														
8/1/02														
9/1/02														
10/1/02														
11/1/02														
12/1/02														
1/1/03														
2/1/03														
3/1/03														
4/1/03														
5/1/03														
7/1/2003														
8/7/03														
9/4/03														
10/1/03														
11/1/03														
12/8/03				1086.60		979.95								
1/1/04				No Data Available		No Data Available								
2/1/04														
3/10/04				1084.95		1003.05								
4/1/04				No Data Available		No Data Available								
5/1/04														
6/4/04				1086.10		1011.25								
7/1/04				No Data Available		No Data Available								
8/1/04														
9/20/04				1084.15		1033.75								
10/1/04				No Data Available		No Data Available								
11/1/04														
12/8/04				1084.28		986.68								
1/31/05				1081.75		1025.90								
2/28/05				1085.34		1026.79								
3/28/2005	131.35	1093.01	130.50	1090.60	195.55	1026.03								
4/26/2005	131.46	1092.90	131.11	1089.99	196.15	1025.43								
5/23/2005	131.25	1093.11	129.31	1091.79	183.45	1038.13								
6/17/2005	130.59	1093.77	128.51	1092.59	186.12	1035.46								
7/26/2005	129.84	1094.52	127.51	1093.59	175.39	1046.19								
8/10/2005	129.21	1095.15	126.85	1094.25	158.26	1063.32								
9/13/2005	128.04	1096.32	125.57	1095.53	181.95	1039.63								

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-103		MW-104S		MW-104D		MW-105		MW-106		MW-107		MW-108	
	Measuring Point Elevation: 1224.36 Prior to July, 2011		Measuring Point Elevation: 1221.10 Prior to July, 2011		Measuring Point Elevation: 1221.58 Prior to July, 2011		Measuring Point Elevation: 1227.36 Prior to July, 2011		Measuring Point Elevation: 1221.36 Prior to July, 2011		Measuring Point Elevation: 1223.50 Prior to July, 2011		Measuring Point Elevation: 1217.30 Prior to July, 2011	
	Measuring Point Elevation: 1226.69 [4] After August, 2011		Measuring Point Elevation: 1222.98 After July, 2011		Measuring Point Elevation: 1223.42 After July, 2011		Measuring Point Elevation: 1229.11 After July, 2011		Measuring Point Elevation: 1223.16 After July, 2011		Measuring Point Elevation: 1225.32 After July, 2011		Measuring Point Elevation: 1219.14 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
10/11/2005	127.11	1097.25	124.31	1096.79	148.27	1073.31	Well Installed June 2006		Well Installed Sept-2006		Well Installed May 2007		Well Installed May 2007	
11/18/2005	126.20	1098.16	123.52	1097.58	154.12	1067.46								
12/19/2005	125.81	1098.55	123.11	1097.99	158.50	1063.08								
1/18/2006	125.30	1099.06	118.81	1102.29	167.32	1054.26								
2/14/2006	125.05	1099.31	122.57	1098.53	156.88	1064.70								
3/31/2006	123.51	1100.85	121.09	1100.01	141.89	1079.69								
4/19/2006	122.49	1101.87	120.22	1100.88	144.69	1076.89								
5/25/2006	122.00	1102.36	119.34	1101.76	168.61	1052.97								
6/21/2006	121.70	1102.66	119.03	1102.07	157.26	1064.32	124.50	1102.86						
7/21/2006	121.30	1103.06	118.51	1102.59	156.92	1064.66	124.11	1103.25						
8/24/2006	120.19	1104.17	117.43	1103.67	151.70	1069.88	123.02	1104.34						
9/22/2006	119.58	1104.78	116.62	1104.48	157.59	1063.99	122.33	1105.03	116.75	1104.61				
10/20/2006	119.03	1105.33	116.17	1104.93	148.18	1073.40	121.90	1105.46	116.31	1105.05				
11/21/2006	118.71	1105.65	115.67	1105.43	157.96	1063.62	121.44	1105.92	115.85	1105.51				
12/11/2006	118.35	1106.01	115.55	1105.55	161.10	1060.48	121.22	1106.14	115.6	1105.76				
1/25/2007	117.98	1106.38	115.15	1105.95	158.32	1063.26	120.83	1106.53	115.28	1106.08				
2/21/2007	117.22	1107.14	114.88	1106.22	175.24	1046.34	120.25	1107.11	114.91	1106.45				
3/22/2007	117.47	1106.89	115.41	1105.69	167.12	1054.46	120.39	1106.97	115.42	1105.94				
4/12/2007	119.50	1104.86	117.08	1104.02	194.97	1026.61	122.46	1104.90	117.58	1103.78				
5/23/2007	122.81	1101.55	120.06	1101.04	197.77	1023.81	125.38	1101.98	120.71	1100.65	121.29	1102.21	116.9	1100.40
6/4/2007	123.48	1100.88	121.00	1100.10	201.95	1019.63	126.03	1101.33	121.3	1100.06	121.69	1101.81	117.58	1099.72
7/13/2007	121.71	1102.65	119.78	1101.32	183.22	1038.36	124.93	1102.43	120.5	1100.86	120.86	1102.64	116.25	1101.05
8/21/2007	121.20	1103.16	119.12	1101.98	189.04	1032.54	124.18	1103.18	118.95	1102.41	120.38	1103.12	115.58	1101.72
9/17/2007	120.90	1103.46	118.58	1102.52	173.45	1048.13	123.90	1103.46	118.5	1102.86	120.06	1103.44	115.1	1102.20
10/11/2007	120.69	1103.67	118.40	1102.70	187.77	1033.81	123.61	1103.75	118.31	1103.05	119.81	1103.69	114.89	1102.41
11/7/2007	120.62	1103.74	118.19	1102.91	175.15	1046.43	123.46	1103.90	118.13	1103.23	119.68	1103.82	114.66	1102.64
12/10/2007	119.83	1104.53	117.84	1103.26	167.71	1053.87	123.04	1104.32	117.75	1103.61	119.15	1104.35	114.2	1103.10
1/31/2008	119.33	1105.03	117.24	1103.86	156.85	1064.73	122.56	1104.80	117.1	1104.26	118.89	1104.61	113.71	1103.59
2/27/2008	118.18	1106.18	116.25	1104.85	150.30	1071.28	121.30	1106.06	116.1	1105.26	117.58	1105.92	112.83	1104.47
3/17/2008	117.95	1106.41	115.85	1105.25	144.21	1077.37	121.03	1106.33	115.68	1105.68	117.2	1106.30	112.4	1104.90
4/16/2008	NM		115.19	1105.91	142.56	1079.02	120.52	1106.84	115.13	1106.23	116.7	1106.80	111.77	1105.53
5/21/2008	NM		114.29	1106.81	140.74	1080.84	119.85	1107.51	114.35	1107.01	NM		110.91	1106.39
6/2/2008	116.45	1107.91	114.06	1107.04	138.06	1083.52	119.41	1107.95	113.96	1107.40	115.65	1107.85	110.57	1106.73
6/18/2008	116.35	1108.01	113.75	1107.35	138.70	1082.88	119.16	1108.20	113.81	1107.55	115.25	1108.25	110.39	1106.91
7/23/2008	115.80	1108.56	112.86	1108.24	143.75	1077.83	118.55	1108.81	113.06	1108.30	NM		109.52	1107.78
8/21/2008	115.21	1109.15	112.30	1108.80	147.58	1074.00	118.05	1109.31	112.54	1108.82	NM		109.01	1108.29
9/9/2008	114.85	1109.51	111.95	1109.15	137.35	1084.23	117.60	1109.76	112.1	1109.26	113.7	1109.80	108.61	1108.69
10/15/2008	115.41	1108.95	111.31	1109.79	130.85	1090.73	117.19	1110.17	111.59	1109.77	113.16	1110.34	108.05	1109.25
11/19/2008	NM		110.84	1110.26	145.95	1075.63	116.62	1110.74	111.12	1110.24	NM		107.56	1109.74
12/9/2008	113.65	1110.71	110.73	1110.37	148.28	1073.30	116.36	1111.00	110.98	1110.38	112.5	1111.00	107.4	1109.90
5/28/2010	107.26	1117.10	104.22	1116.88	120.46	1101.12	109.96	1117.40	104.46	1116.90	106.03	1117.47	100.98	1116.32
6/30/2010	NM		NM		NM		109.41	1117.95	104.03	1117.33	105.51	1117.99	100.54	1116.76
8/31/2010	106.34	1118.02	102.99	1118.11	NM		108.93	1118.43	103.37	1117.99	NM		NM	
9/22/2010	105.84	1118.52	102.48	1118.62	NM		108.46	1118.90	102.86	1118.50	NM		NM	
10/18/2010	105.23	1119.13	101.70	1119.40	115.95	1105.63	107.81	1119.55	102.19	1119.17	103.75	1119.75	98.6	1118.70
11/18/2010	104.80	1119.56	101.40	1119.70	NM		107.42	1119.94	101.79	1119.57	NM		NM	
12/29/2010	104.09	1120.27	100.79	1120.31	NM		106.76	1120.60	101.18	1120.18	NM		NM	
1/31/2011	103.76	1120.60	100.63	1120.47	NM		106.50	1120.86	101.00	1120.36	NM		NM	
2/25/2011	103.59	1120.77	100.30	1120.80	NM		106.25	1121.11	100.64	1120.72	NM		NM	
3/29/2011	103.19	1121.17	99.97	1121.13	NM		105.80	1121.56	100.24	1121.12	NM		NM	
4/15/2011	102.91	1121.45	99.84	1121.26	111.04	1110.54	105.67	1121.69	100.13	1121.23	101.58	1121.92	96.58	1120.72
5/24/2011	102.67	1121.69	99.40	1121.70	NM		105.22	1122.14	99.7	1121.66	NM		NM	
6/22/2011	102.19	1122.17	99.04	1122.06	NM		104.86	1122.50	99.36	1122.00	NM		NM	
7/29/2011	NM		98.78	1124.20	NM		104.68	1124.43	99.12	1124.04	NM		NM	
8/30/2011	102.03	1124.66	98.43	1124.55	NM		104.27	1124.84	98.73	1124.43	NM		NM	
9/27/2011	101.52	1125.17	98.18	1124.80	107.49	1115.93	103.90	1125.21	98.43	1124.73	99.96	1125.36	94.96	1124.18
10/14/2011	101.11	1125.58	97.85	1125.13	108.73	1114.69	103.58	1125.53	98.08	1125.08	99.62	1125.70	94.68	1124.46
11/29/2011	101.04	1125.65	97.58	1125.40	NM		103.35	1125.76	97.88	1125.28	NM		NM	
12/30/2011	NM		97.03	1125.95	NM		102.41	1126.70	97.11	1126.05	NM		NM	
1/26/2012	100.17	1126.52	97.02	1125.96	NM		102.67	1126.44	97.23	1125.93	NM		NM	
2/28/2012	99.89	1126.80	96.87	1126.11	NM		102.37	1126.74	96.99	1126.17	NM		NM	
3/23/2012	NM		96.72	1126.26	NM		102.41	1126.70	96.90	1126.26	NM		NM	
4/27/2012	100.26	1126.43	96.86	1126.12	119.42	1104.00	102.65	1126.46	97.05	1126.11	98.52	1126.80	93.50	1125.64
5/25/2012	100.34	1126.35	96.95	1126.03	NM		102.63	1126.48	97.13	1126.03	NM		NM	

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-103		MW-104S		MW-104D		MW-105		MW-106		MW-107		MW-108	
	Measuring Point Elevation: 1224.36 Prior to July, 2011		Measuring Point Elevation: 1221.10 Prior to July, 2011		Measuring Point Elevation: 1221.58 Prior to July, 2011		Measuring Point Elevation: 1227.36 Prior to July, 2011		Measuring Point Elevation: 1221.36 Prior to July, 2011		Measuring Point Elevation: 1223.50 Prior to July, 2011		Measuring Point Elevation: 1217.30 Prior to July, 2011	
	Measuring Point Elevation: 1226.69[4] After August, 2011		Measuring Point Elevation: 1222.98 After July, 2011		Measuring Point Elevation: 1223.42 After July, 2011		Measuring Point Elevation: 1229.11 After July, 2011		Measuring Point Elevation: 1223.16 After July, 2011		Measuring Point Elevation: 1225.32 After July, 2011		Measuring Point Elevation: 1219.14 After July, 2011	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
6/29/2012	101.01	1125.68	97.63	1125.35	NM		103.30	1125.81	97.84	1125.32	NM		NM	
7/24/2012	101.57	1125.12	98.51	1124.47	NM		103.89	1125.22	98.76	1124.40	NM		NM	
8/27/2012	102.16	1124.53	99.33	1123.65	NM		104.59	1124.52	99.31	1123.85	NM		NM	
9/25/2012	102.78	1123.91	99.88	1123.10	NM		105.19	1123.92	99.76	1123.40	NM		NM	
10/12/2012	103.04	1123.65	100.21	1122.77	127.83	1095.59	105.53	1123.58	100.05	1123.11	101.57	1123.75	96.65	1122.49
11/29/2012	103.59	1123.10	101.00	1121.98	NM		106.15	1122.96	100.82	1122.34	NM		NM	
12/27/2012	103.70	1122.99	101.34	1121.64	NM		106.36	1122.75	101.14	1122.02	NM		NM	
1/31/2013	103.89	1122.80	101.37	1121.61	NM		106.52	1122.59	101.19	1121.97	NM		NM	
2/21/2013	NM		101.48	1121.50	NM		106.63	1122.48	101.31	1121.85	NM		NM	
3/29/2013	104.30	1122.39	101.62	1121.36	NM		106.85	1122.26	101.47	1121.69	NM		NM	
4/19/2013	104.80	1121.89	101.92	1121.06	139.17	1084.25	106.99	1122.12	101.74	1121.42	103.18	1122.14	98.41	1120.73
5/31/2013	105.47	1121.22	102.76	1120.22	NM		107.88	1121.23	102.54	1120.62	NM		NM	
6/28/2013	105.93	1120.76	103.04	1119.94	NM		108.16	1120.95	102.91	1120.25	NM		NM	
7/15/2013	106.25	1120.44	103.41	1119.57	NM		108.57	1120.54	103.27	1119.89	NM		NM	
8/28/2013	NM		104.06	1118.92	NM		109.21	1119.90	103.81	1119.35	NM		NM	
9/25/2013	NM		104.44	1118.54	NM		109.50	1119.61	104.19	1118.97	NM		NM	
10/25/2013	107.57	1119.12	105.00	1117.98	153.60	1069.82	110.03	1119.08	104.71	1118.45	106.21	1119.11	101.39	1117.75
11/29/2013	107.75	1118.94	105.40	1117.58	NM		110.30	1118.81	105.03	1118.13	NM		NM	
12/31/2013	NM		105.40	1117.58	NM		110.39	1118.72	105.06	1118.10	NM		101.81	1117.33
1/30/2014	107.93	1118.76	105.39	1117.59	NM		110.45	1118.66	105.12	1118.04	NM		101.79	1117.35
2/24/2014	107.93	1118.76	105.60	1117.38	NM		110.52	1118.59	105.25	1117.91	NM		102.03	1117.11
3/26/2014	NM		105.60	1117.38	NM		110.57	1118.54	105.27	1117.89	NM		102.06	1117.08
4/15/2014	108.65	1118.04	106.11	1116.87	148.50	1074.92	110.88	1118.23	105.96	1117.20	107.05	1118.27	102.79	1116.35
5/30/2014	109.05	1117.64	107.17	1115.81	NM		111.81	1117.30	106.70	1116.46	NM		103.60	1115.54
6/25/2014	109.60	1117.09	107.63	1115.35	NM		112.23	1116.88	107.14	1116.02	NM		104.11	1115.03
7/17/2014	110.40	1116.29	108.47	1114.51	NM		113.06	1116.05	107.92	1115.24	NM		NM	
8/26/2014	111.43	1115.26	109.67	1113.31	NM		114.08	1115.03	109.04	1114.12	NM		106.13	1113.01
9/26/2014	110.45	1116.24	108.56	1114.42	NM		113.14	1115.97	108.00	1115.16	NM		105.08	1114.06
12/11/2014	110.27	1116.42	108.38	1114.60	144.26	1079.16	112.98	1116.13	107.87	1115.29	109.21	1116.11	104.81	1114.33
2/23/2015	109.66	1117.03	107.90	1115.08	148.04	1075.38	112.37	1116.74	107.66	1115.50	109.15	1116.17	104.51	1114.63

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[4] MW-103 raised 7.125 inches in August 2011

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-109		MW-110		MW-111		MW-112		MW-113		MW-114		MW-115	
	Measuring Point Elevation: 1218.30 Prior to July, 2011		Measuring Point Elevation: 1221.09 Prior to July, 2011		Measuring Point Elevation: 1223.2 Prior to July, 2011		Measuring Point Elevation: 1227.33 Prior to July, 2011		Measuring Point Elevation: 1219.10		Measuring Point Elevation: 1223.76		Measuring Point Elevation: 1222.97	
	Measuring Point Elevation: 1220.18 After July, 2011		Measuring Point Elevation: 1222.89 After July, 2011		Measuring Point Elevation: 1224.99 After July, 2011		Measuring Point Elevation: 1229.14 After July, 2011							
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
1/27/95	Well Installed May 2007		Well Installed Feb 2008		Well Installed Feb 2008		Well Installed Feb 2008		Well Installed June 2011		Well Installed July 2011		Well Installed September 2013	
3/22/95														
7/17/95														
10/26/95														
1/29/96														
4/30/96														
7/23/96														
10/25/96														
1/1/01														
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2/28/05														
3/28/2005														
4/26/2005														
5/23/2005														
6/17/2005														
7/26/2005														
8/10/2005														
9/13/2005														

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-109		MW-110		MW-111		MW-112		MW-113		MW-114		MW-115	
	Measuring Point Elevation: 1218.30 Prior to July, 2011		Measuring Point Elevation: 1221.09 Prior to July, 2011		Measuring Point Elevation: 1223.2 Prior to July, 2011		Measuring Point Elevation: 1227.33 Prior to July, 2011		Measuring Point Elevation: 1219.10		Measuring Point Elevation: 1223.76		Measuring Point Elevation: 1222.97	
	Measuring Point Elevation: 1220.18 After July, 2011		Measuring Point Elevation: 1222.89 After July, 2011		Measuring Point Elevation: 1224.99 After July, 2011		Measuring Point Elevation: 1229.14 After July, 2011							
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
10/11/2005	Well Installed May 2007		Well Installed Feb 2008		Well Installed Feb 2008		Well Installed Feb 2008		Well Installed June 2011		Well Installed July 2011		Well Installed September 2013	
11/18/2005														
12/19/2005														
1/18/2006														
2/14/2006														
3/31/2006														
4/19/2006														
5/25/2006														
6/21/2006														
7/21/2006														
8/24/2006														
9/22/2006														
10/20/2006														
11/21/2006														
12/11/2006														
1/25/2007														
2/21/2007														
3/22/2007														
4/12/2007														
5/23/2007	117.45	1100.85												
6/4/2007	118.37	1099.93												
7/13/2007	117.33	1100.97												
8/21/2007	116.55	1101.75												
9/17/2007	115.97	1102.33												
10/11/2007	115.75	1102.55												
11/7/2007	115.51	1102.79												
12/10/2007	115.06	1103.24												
1/31/2008	114.62	1103.68												
2/27/2008	113.71	1104.59	116.32	1104.77	117.63	1105.57	121.1	1106.23						
3/17/2008	113.28	1105.02	115.97	1105.12	117.24	1105.96	120.87	1106.46						
4/16/2008	112.53	1105.77	115.16	1105.93	116.61	1106.59	120.38	1106.95						
5/21/2008	111.57	1106.73	114.15	1106.94	115.74	1107.46	119.61	1107.72						
6/2/2008	111.25	1107.05	113.88	1107.21	115.53	1107.67	119.44	1107.89						
6/18/2008	111.01	1107.29	113.6	1107.49	115.22	1107.98	119.13	1108.20						
7/23/2008	110.03	1108.27	112.57	1108.52	114.4	1108.80	118.45	1108.88						
8/21/2008	109.45	1108.85	111.97	1109.12	113.77	1109.43	117.89	1109.44						
9/9/2008	109	1109.30	111.5	1109.59	113.35	1109.85	117.55	1109.78						
10/15/2008	108.45	1109.85	110.98	1110.11	112.85	1110.35	117.04	1110.29						
11/19/2008	107.96	1110.34	110.49	1110.60	112.35	1110.85	116.54	1110.79						
12/9/2008	107.86	1110.44	110.45	1110.64	112.2	1111.00	116.43	1110.90						
5/28/2010	101.46	1116.84	104.04	1117.05	105.79	1117.41	109.88	1117.45						
6/30/2010	100.91	1117.39	103.31	1117.78	105.14	1118.06	109.38	1117.95						
8/31/2010	NM		NM		NM		NM							
9/22/2010	NM		NM		NM		NM							
10/18/2010	98.8	1119.50	101.26	1119.83	103.31	1119.89	107.78	1119.55						
11/18/2010	NM		NM		NM		NM							
12/29/2010	NM		NM		NM		NM							
1/31/2011	NM		NM		NM		NM							
2/25/2011	NM		NM		NM		NM							
3/29/2011	NM		NM		NM		NM							
4/15/2011	96.99	1121.31	99.54	1121.55	101.27	1121.93	105.43	1121.90						
5/24/2011	NM		NM		NM		NM							
6/22/2011	NM		NM		NM		NM							
7/29/2011	NM		NM		NM		NM		NM		NM			
8/30/2011	NM		NM		NM		NM		94.19	1124.91	98.53	1125.23		
9/27/2011	95.40	1124.78	97.89	1125.00	99.65	1125.34	103.87	1125.27	94.03	1125.07	98.31	1125.45		
10/14/2011	95.08	1125.10	97.56	1125.33	99.30	1125.69	103.47	1125.67	93.77	1125.33	97.98	1125.78		
11/29/2011	NM		NM		NM		NM		93.40	1125.70	97.69	1126.07		
12/30/2011	NM		NM		NM		NM		93.15	1125.95	97.23	1126.53		
1/26/2012	NM		NM		NM		NM		NM		NM			
2/28/2012	NM		NM		NM		NM		93.04	1126.06	97.06	1126.70		
3/23/2012	NM		NM		NM		NM		92.88	1126.22	96.89	1126.87		
4/27/2012	94.06	1126.12	96.70	1126.19	98.37	1126.62	102.44	1126.70	92.91	1126.19	96.93	1126.83		
5/25/2012	NM		NM		NM		NM		93.03	1126.07	97.09	1126.67		

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-109		MW-110		MW-111		MW-112		MW-113		MW-114		MW-115	
	Measuring Point Elevation: 1218.30 Prior to July, 2011		Measuring Point Elevation: 1221.09 Prior to July, 2011		Measuring Point Elevation: 1223.2 Prior to July, 2011		Measuring Point Elevation: 1227.33 Prior to July, 2011		Measuring Point Elevation: 1219.10		Measuring Point Elevation: 1223.76		Measuring Point Elevation: 1222.97	
	Measuring Point Elevation: 1220.18 After July, 2011		Measuring Point Elevation: 1222.89 After July, 2011		Measuring Point Elevation: 1224.99 After July, 2011		Measuring Point Elevation: 1229.14 After July, 2011							
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
6/29/2012	NM		NM		NM		NM		93.92	1125.18	97.84	1125.92		
7/24/2012	NM		NM		NM		NM		94.85	1124.25	98.61	1125.15	Well Installed September 2013	
8/27/2012	NM		NM		NM		NM		96.03	1123.07	99.67	1124.09		
9/25/2012	NM		NM		NM		NM		96.75	1122.35	100.30	1123.46		
10/12/2012	97.65	1122.53	100.44	1122.45	101.66	1123.33	105.11	1124.03	97.12	1121.98	100.73	1123.03		
11/29/2012	NM		NM		NM		NM		98.10	1121.00	101.55	1122.21		
12/27/2012	NM		NM		NM		NM		98.35	1120.75	101.77	1121.99		
1/31/2013	NM		NM		NM		NM		98.41	1120.69	101.85	1121.91		
2/21/2013	NM		NM		NM		NM		98.56	1120.54	102.00	1121.76		
3/29/2013	NM		NM		NM		NM		98.80	1120.30	102.28	1121.48		
4/19/2013	99.51	1120.67	102.10	1120.79	103.29	1121.70	106.68	1122.46	99.03	1120.07	102.50	1121.26		
5/31/2013	NM		NM		NM		NM		99.98	1119.12	103.26	1120.50		
6/28/2013	NM		NM		NM		NM		100.39	1118.71	103.64	1120.12		
7/15/2013	NM		NM		NM		NM		NM		NM			
8/28/2013	NM		NM		NM		NM		101.28	1117.82	104.59	1119.17		
9/25/2013	NM		NM		NM		NM		101.71	1117.39	105.02	1118.74		
10/25/2013	102.63	1117.55	105.37	1117.52	106.42	1118.57	109.65	1119.49	102.33	1116.77	105.63	1118.13	104.64	1118.33
11/29/2013	NM		NM		NM		NM		102.91	1116.19	106.06	1117.70	NM	
12/31/2013	NM		NM		NM		NM		102.88	1116.22	106.05	1117.71	104.85	1118.12
1/30/2014	NM		NM		NM		NM		102.81	1116.29	106.01	1117.75	104.89	1118.08
2/24/2014	NM		NM		NM		NM		103.08	1116.02	106.21	1117.55	105.08	1117.89
3/26/2014	NM		NM		NM		NM		103.24	1115.86	106.26	1117.50	105.05	1117.92
4/15/2014	103.93	1116.25	106.56	1116.33	107.22	1117.77	110.41	1118.73	103.66	1115.44	106.61	1117.15	105.65	1117.32
5/30/2014	NM		NM		NM		NM		105.11	1113.99	107.83	1115.93	106.46	1116.51
6/25/2014	NM		NM		NM		NM		105.72	1113.38	108.30	1115.46	106.94	1116.03
7/17/2014	NM		NM		NM		NM		NM		NM		NM	
8/26/2014	NM		NM		NM		NM		108.05	1111.05	110.30	1113.46	108.80	1114.17
9/26/2014	NM		NM		NM		NM		106.63	1112.47	109.38	1114.38	107.79	1115.18
12/11/2014	106.19	1113.99	108.96	1113.93	109.53	1115.46	112.58	1116.56	106.23	1112.87	109.12	1114.64	107.67	1115.30
2/23/2015	105.78	1114.40	108.58	1114.31	109.53	1115.46	112.49	1116.65	105.75	1113.35	108.74	1115.02	107.35	1115.62

TABLE 5
Historical Groundwater Elevation Data
Cooper and Commerce WQARF Site

Date	MW-116		MW-117		MW-118		MW-119S		MW-119D	
	Measuring Point Elevation: 1227.05		Measuring Point Elevation: 1225.38		Measuring Point Elevation: 1230.61		Measuring Point Elevation: 1230.94		Measuring Point Elevation: 1231.25	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
1/27/95	Well Installed August 2013		Well Installed August 2013		Well Installed September 2013		Well Installed September 2013		Well Installed October 2013	
3/22/95										
7/17/95										
10/26/95										
1/29/96										
4/30/96										
7/23/96										
10/25/96										
1/1/01										
2/1/01										
3/1/01										
4/1/01										
5/1/01										
6/1/01										
7/1/01										
8/1/01										
9/1/01										
10/1/01										
11/1/01										
12/1/01										
1/22/02										
2/1/02										
3/1/02										
4/1/02										
5/1/02										
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12/1/02										
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5/1/03										
7/1/2003										
8/7/03										
9/4/03										
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12/8/03										
1/1/04										
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9/20/04										
10/1/04										
11/1/04										
12/8/04										
1/31/05										
2/28/05										
3/28/2005										
4/26/2005										
5/23/2005										
6/17/2005										
7/26/2005										
8/10/2005										
9/13/2005										

Date	**MW-116**		**MW-117**		**MW-118**		**MW-119S**		**MW-119D**	
	Measuring Point Elevation: 1227.05		Measuring Point Elevation: 1225.38		Measuring Point Elevation: 1230.61		Measuring Point Elevation: 1230.94		Measuring Point Elevation: 1231.25	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
10/11/2005	Well Installed August 2013		Well Installed August 2013		Well Installed September 2013		Well Installed September 2013		Well Installed October 2013	
11/18/2005										
12/19/2005										
1/18/2006										
2/14/2006										
3/31/2006										
4/19/2006										
5/25/2006										
6/21/2006										
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8/24/2006										
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3/17/2008										
4/16/2008										
5/21/2008										
6/2/2008										
6/18/2008										
7/23/2008										
8/21/2008										
9/9/2008										
10/15/2008										
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12/9/2008										
5/28/2010										
6/30/2010										
8/31/2010										
9/22/2010										
10/18/2010										
11/18/2010										
12/29/2010										
1/31/2011										
2/25/2011										
3/29/2011										
4/15/2011										
5/24/2011										
6/22/2011										
7/29/2011										
8/30/2011										
9/27/2011										
10/14/2011										
11/29/2011										
12/30/2011										
1/26/2012										
2/28/2012										
3/23/2012										
4/27/2012										
5/25/2012										

Date	**MW-116**		**MW-117**		**MW-118**		**MW-119S**		**MW-119D**	
	Measuring Point Elevation: 1227.05		Measuring Point Elevation: 1225.38		Measuring Point Elevation: 1230.61		Measuring Point Elevation: 1230.94		Measuring Point Elevation: 1231.25	
	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
6/29/2012										
7/24/2012	Well Installed August 2013		Well Installed August 2013		Well Installed September 2013		Well Installed September 2013		Well Installed October 2013	
8/27/2012										
9/25/2012										
10/12/2012										
11/29/2012										
12/27/2012										
1/31/2013										
2/21/2013										
3/29/2013										
4/19/2013										
5/31/2013										
6/28/2013										
7/15/2013										
8/28/2013										
9/25/2013										
10/25/2013	108.50	1118.55	106.51	1118.87	111.49	1119.12	112.25	1118.69	146.15	1085.10
11/29/2013	NM		106.75	1118.63	NM		NM		NM	
12/31/2013	NM		106.79	1118.59	111.80	1118.81	112.58	1118.36	NM	
1/30/2014	NM		106.87	1118.51	111.85	1118.76	112.60	1118.34	NM	
2/24/2014	NM		106.95	1118.43	111.86	1118.75	112.73	1118.21	NM	
3/26/2014	NM		106.91	1118.47	111.85	1118.76	112.74	1118.20	NM	
4/15/2014	109.54	1117.51	107.38	1118.00	112.53	1118.08	113.41	1117.53	151.47	1079.78
5/30/2014	NM		108.26	1117.12	113.18	1117.43	114.09	1116.85	NM	
6/25/2014	NM		108.64	1116.74	113.56	1117.05	114.54	1116.40	NM	
7/17/2014	NM		NM		NM		115.41	1115.53	161.39	1069.86
8/26/2014	NM		110.52	1114.86	115.35	1115.26	116.39	1114.55	NM	
9/26/2014	NM		109.54	1115.84	114.07	1116.54	115.28	1115.66	NM	
12/11/2014	111.47	1115.58	109.50	1115.88	114.15	1116.46	115.20	1115.74	149.62	1081.63
2/23/2015	111.15	1115.90	109.37	1116.01	114.15	1116.46	114.98	1115.96	154.80	1076.45

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
	Parameter	Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
	Units	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	**NE**		**5**[a]		**100**[b]		**70**		**5**[a]		**NE**		**700**[a]				**NE**		**5**[a]		**1000**[a]		**5**[a]		**NE**		**NE**		**10000**[a]	
	Reported Detection Limit ESC (Prior to 9/08)	50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
	Reported Detection Limit Test America (Post 9/08)	10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
	Reported Detection Limit Test America (As of 1/11)	10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
EW-101	6/20/2006	170	J	U		7.7	J, J4	U		U		U		U		U		U		**1200**		U		U		U		U		U	
	8/30/2006	U	J4	U		0.72	J	U		0.86	J	U		U		U		U		**1700**		U		1.3		U		U		U	
	12/12/2006	U		U		1.4	J	U		U		U		U		U		U	J3	**540**	T2	U		2.1		U		U		U	
	3/22/2007	U		U		0.92	J	U		U		U		U		U		U		**730**	T2	U		1.9		U		U		U	
	3/22/2007 [c]	U		U		0.66	J	U		U		U		U		U		U		**1600**		U		1.5		U		U		U	
	6/4/2007	U		U		1.7	J	U		U		U		U		U		U		**800**		U		0.87	J	U		U		U	
	9/19/2007	U		5.3		U		U		U		U		U		U		U		**940**		U		U		U	J	2	J	10	J
	9/19/2007 [c]	<500		<10		<50		<10		<10		<10		5.8	J	<10		83		**990**		<50		<10		49		<10		<30	
	12/12/2007	U		U		U		U		U		U		U		U		U		**780**		U		U		U		U		U	
	12/12/2007 [c]	<500		<10		<50		<10		<10		<10		U		<10		<50		**790**		<50		<10		<10		<10		<30	
	3/20/2008	U		U		0.86	J	U		U		U		U		U		U		**680**		U		0.45		U		U		U	
	6/5/2008	U		U		U		U		U		U		U		U		U		**230**		U		U		U		U		U	
	9/11/2008	U		U		0.96		U		U		U		U		U		U		**280**		U		U		U		U		U	
	12/12/2008	U		U		0.99		U		U		U		U		U		U		**290**		U		0.57		U		U		U	
	10/21/2010	U		U		1.44		U		U		U		U		U		U		**89.6**		U		U		U		U		U	
	4/15/2011	U		U		1.6		U		U		U		U		U		U		**53**		U		U		U		U		U	
	10/14/2011	U		U		1.6		U		U		U		U		U		U		**37**		U		U		U		U		U	
	4/27/2012	U		U		1.3		U		U		U		U		U		U		**23**		U		U		U		U		U	
	10/11/2012	U		U		1.3		U		U		U		U		U		U		**15**		U		U		U		U		U	
	4/18/2013	U	L5	U		1.1		U		U		U		U		U		U		**6.4**		U		U		U		U		U	
	10/25/2013	U		U		1.4		U		U		U		U		U		U		**5.0**		U		U		U		U		U	
	4/15/2014	U		U		1.0		U		U		U		U		U		U		2.4		U		U		U		U		U	
MW-101	6/20/2006	U		U		1.1	J, J4	U		U		U		U		U		U		**420**		U		0.44	J	U		U		U	
	8/30/2006	U	J4	U		1.2	J	U		0.82	J	U		U		U		U		**270**		U		U		U		U		U	
	12/12/2006	U		U		2.2	J	U		U		U		U		U		U	J3	**130**	T2	U		0.56	J	U		U		U	
	3/21/2007	U		U		1.4	J	8.3	J	U		U		U		U		U		**1600**		U		1.1		U		U		U	
	6/4/2007	U		U		1.8	J	U		U		U		U		U		U		**400**		U		0.63	J	U		U		U	
	9/18/2007	U		U		1.6	J	U		U		U		U		U		U		**300**		U		U		U		U		U	
	12/12/2007	U		U		U		U		U		U		U		U		U		**280**		U		U		U		U		U	
	3/19/2008	U		U		1.0	J	U		U		U		U		3.4		0.41	J	**160**		5.3		U		0.3		U		U	
	6/4/2008	U		U		0.92	J	U		U		U		U		U		U	J	**57**		U		U		U		U		U	
	9/11/2008	U		U		1.00		U		U		U		U		U		U		**24**		U		U		U		U		U	
	12/11/2008	U		U		1.20		U		U		U		U		U		U		**20**		U		U		U		U		U	
	5/29/2010	U		U		1.20	J	U		U		U		U		U		U		**14**		U		U		U		U		U	
	10/21/2010	U		U		2.99		U		U		U		U		U		U		**222**	D2	U		U		U		U		U	
	10/21/2010 [c]	U		U		3.45		U		U		U		U		U		U		**223**	D2	U		U		U		U		U	
	1/31/2011	U		U		3.15		U		U		U		U		U		U		**126.0**	D2	U		U		U		U		U	
	4/14/2011	U		U		4.0		U		U		U		U		U		U		**110**		U		U		U		U		U	
	10/13/2011	U		U		2.3		U		U		U		U		U		U		**15**		U		U		U		U		U	
	10/13/2011 [c]	U		U		2.2		U		U		U		U		U		U		**15**		U		U		U		U		U	
	1/26/2012	U	L3	U		1.8		U		U		U		U		U		U		**18**		U		U		U		U		U	
	4/27/2012	U		U		2.2		U		U		U		U		U		U		**17**		U		U		U		U		U	
	10/11/2012	U		U		2.5		U		U		U		U		U		U		**19**		U		U		U		U		U	
	1/23/2013	U		U		1.7		U		U		U		U		U	N1	U		**11**		U		U		U		U		U	
	4/18/2013	U	L5	U		1.7		U		U		U		U		U		U		**6.9**		U		U		U		U		U	
	7/16/13 122'	U		U		1.9		U		U		U		U		U		U		**7.6**		U		U		U		U		U	
	7/16/13 141'-143'	U		U		2.1		U		U		U		U		U		U		**11**		U		U		U		U		U	
	7/16/13 155'-157'	U		U		2.1		U		U		U		U		U		U		3.6		U		U		U		U		U	
	10/24/2013	U		U		2.0		U		U		U		U		U		U		4.3		U		U		U		U		U	
	1/17/2014	U	V1	U		1.8		U		U		U		U		U		U		3.7		U		U		U		U		U	
	4/15/2014	U		U		1.5		U		U		U		U		U		U		3.1		U		U		U		U		U	
	7/17/2014	U		U		1.6		U		U		U		U		U		U		1.5		U		U		U		U		U	
	12/11/2014	U		U		0.90		U		U		U		U		U		U		0.71		U		U		U		U		U	
	2/24/2015	U		U		0.66		U		U		U		U		U		U		2.0		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-102	3/29/2005	U		U		0.88	J	U		U		U		U		U		U		**18**		0.37	J	0.52	J	0.42	J	U		U	
	5/23/2005	U		U		0.59	J	U		U		U		U		U		U	J4	**24**		U		U		0.44	J	U		U	
	5/23/2005 ^{c}	U		U		0.56	J	U		U		U		U		U		U	J4	**23**		U		U		0.41	J	U		U	
	9/12/2005	U		U		1.4	J	U		U		U		U		U		U		**19**		U		U		U		U		U	
	12/19/2005	U		U		1.6	J	U		U		U		U		U		U	J3	**270**		U		0.59	J	U		U		U	
	3/30/2006	U		U		1.4	J	U		U		U		U		U		U		**330**		U		0.62	J	0.44	J	U		U	
	6/21/2006	U		U		1.9	J	U		U		U	J4	U		U		U		**760**		0.57	J	0.44	J	U		U		U	
	6/21/2006 ^{c}	U		U		2.3	J	U		U		U	J4	U		U		U		**570**		0.54	J	0.32	J	U		U		U	
	8/30/2006	U	J4	U		1.2	J	U		U		U		U		U		U		**390**		U		0.51	J	U		U		U	
	12/11/2006	U		U		1.9	J	U		U		U		U		U		U	J3	**160**	T2	U		0.66	J	0.35	J	U		U	
	3/21/2007	U		U		U		U		U		U		U		U		U		**810**		3.3	J	U		2.6	J	U		18	J
	6/5/2007	U		U		U		U		U		U		U		U		U		**520**		U		U		U		U		U	
	6/5/2007 ^{c}	U		U		U		U		U		U		U		U		U		**540**		U		U		U		U		U	
	9/18/2007	U		U		1.3	J	U		U		U		U		U		U		**310**		U		U		U		U		U	
	12/12/2007	U		U		0.84	J	U		U		U		U		U		U		**120**		U		U		0.49	J	U		U	
	3/20/2008	U		U		0.56	J	U		U		U		U		U		U		**65**		0.71	J	U		0.39	J	U		U	
	3/20/2008 ^{c}	U		U		0.56	J	U		U		U		U		U		U		**75**		0.7		U		U		U		U	
	6/5/2008	U		U		0.68	J	U		U		U		U		U		U		**64**		U		U		0.3	J	U		U	
	6/5/2008 ^{c}	U		U		0.59	J	U		U		U		U		U		U		**57**		<5.0		U		U		U		U	
	9/10/2008	U		U		1.1		U		U		U		U		U		U		**200**		U		U		U		U		U	
	9/10/2008 ^{c}	U		U		1		U		U		U		U		U		U		**230**		U		U		U		U		U	
	12/11/2008	U		U		1.1		U		U		U		U		U		U		**230**		U		U		U		U		U	
	5/29/2010	U		U		1.5	J	U		U		U		U		U		U		**330**		U		U		U		U		U	
	5/29/2010 ^{c}	U		U		1.6	J	U		U		U		U		U		U		**370**		U		U		U		U		U	
	10/21/2010	U		U		1.89		U		U		U		U		U		U		**245**	D2	U		1.92		U		U		U	
	1/31/2011	U		U		2.22		U		U		U		U		U		U		**124.0**	D2	U		0.730		U		U		U	
	1/31/2011 ^{c}	U		U		2.21		U		U		U		U		U		U		**127.0**	D2	U		0.750		U		U		U	
	4/14/2011	U		U		1.8		U		U		U		U		U		U		**130**		U		0.99		U		U		U	
	4/14/2011 ^{c}	U		U		1.6		U		U		U		U		U		U		**120**		U		0.94		U		U		U	
	10/14/2011	U		U		1.6		U		U		U		U		U		U		**130**		U		1.2		U		U		U	
	1/26/2012	U	L3	U		1.3		U		U		U		U		U		U		**43**		U		U		U		U		U	
	4/27/12 100'-102'	U		U		1.0		U		U		U		U		U		U		**130**		U		1.4		U		U		U	
	4/27/12 122'-124'	U		U		1.0		U		U		U		U		U		U		**140**		U		2.0		U		U		U	
	4/27/12 141'-143'	U		U		1.1		U		U		U		U		U		U		**130**		U		1.6		U		U		U	
	4/27/12 155'-157'	U		U		1.1		U		U		U		U		U		U		**110**		U		1.1		U		U		U	
	10/12/12 100'-102'	U		U		0.75		U		U		U		U		U		U		**75**		U		1.2		U		U		U	
	10/12/12 122'-124'	U		U		0.70		U		U		U		U		U		U		**65**		U		1.0		U		U		U	
	10/12/12 141'-143'	U		U		0.95		U		U		U		U		U		U		**17**		U		U		U		U		U	
	10/12/12 155'-157'	U		U		0.97		U		U		U		U		U		U		**16**		U		U		U		U		U	
	1/29/13 100'-102'^{c}	U		U		0.85		U		U		U		U		U		U		**13**		0.78		U		U		U		1.5	
	1/29/13 122'-124'	U		U		0.98		U		U		U		U		U		U		**14**		U		U		U		U		U	
	1/29/13 141'-143'	U		U		1.3		U		U		U		U		U		U		3.4		U		U		U		U		U	
	1/29/13 155'-157'	U		U		1.4		U		U		U		U		U		U		2.7		U		U		U		U		U	
	4/19/13 100'-102'^{c}	U	L5	U		0.52		U		U		U		U		U		U		**21**		U		U		U		U		U	
	4/19/13 122'-124'	U	L5	U		U		U		U		U		U		U		U		**23**		U		U		U		U		U	
	4/19/13 141'-143'	U	L5	U		0.65		U		U		U		U		U		U		2.5		U		U		U		U		U	
	4/19/13 155'-157'	U	L5	U		0.70		U		U		U		U		U		U		2.9		U		U		U		U		U	
	7/16/13 100'-102'^{c}	U		U		U		U		U		U		U		U		U		**17**		U		U		U		U		U	
	7/16/13 122'-124'	U		U		U		U		U		U		U		U		U		**15**		U		U		U		U		U	
	7/16/13 141'-143'	U		U		0.85		U		U		U		U		U		U		2.1		U		U		U		U		U	
	7/16/13 155'-157'	U		U		0.85		U		U		U		U		U		U		3.9		U		U		U		U		U	
	10/31/13 100'-102'^{c}	U		U		U		U		U		U		U		U		U		**11**		U		U		U		U		U	
	10/31/13 122'-124'	U		U		U		U		U		U		U		U		U		**13**		U		U		U		U		U	
	10/31/13 141'-143'	U		U		0.64		U		U		U		U		U		U		1.1		U		U		U		U		U	
	10/31/13 153'-155'	U		U		0.68		U		U		U		U		U		U		U		U		U		U		U		U	
	1/23/14 100'-102'^{c}	U		U		U		U		U		U		U		U		U		**19**		U		U		U		U		U	
	1/23/14 122'-124'	U		U		U		U		U		U		U		U		U		**15**		U		U		U		U		U	
	1/23/14 141'-143'	U		U		0.89		U		U		U		U		U		U		1.4		U		U		U		U		U	
	1/23/14 155'-157'	U		U		0.83		U		U		U		U		U		U		3.4		U		U		U		U		U	
	4/10/14 100'-102'^{c}	U		U		U		U		U		U		U		U		U		**7.9**		U		U		U		U		U	
	4/10/14 122'-124'	U		U		U		U		U		U		U		U		U		**8.1**		U		U		U		U		U	
	4/10/14 141'-143'	U		U		0.53		U		U		U		U		U		U		0.96		U		U		U		U		U	
	4/10/14 155'-157'	U		U		0.51		U		U		U		U		U		U		0.92		U		U		U		U		U	
	7/17/14 100'-102'^{c}	28		U		U		U		U		U		U		U		U		**6.4**		U		U		U		U		U	
	7/17/14 122'-124'	28		U		U		U		U		U		U		U		U		**6.5**		U		U		U		U		U	
	7/17/14 141'-143'	39		U		0.67		U		U		U		U		U		U		1.1		U		U		U		U		U	
	7/17/14 155'-157'	29		U		0.68		U		U		U		U		U		U		0.67		U		U		U		U		U	
	12/11/2014	U		U		0.58		U		U		U		U		U		U		0.30	E4	U		U		U		U		U	
	2/24/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-103	3/29/2005	U		U		1.3	J	U		U		U		U		U		U		**27**		0.39	J	0.3	J	0.54	J	0.62	J	0.86	J
	3/29/2005^{c}	U		U		1	J	U		U		U		U		U		U		**28**		0.51	J	U		U		U		0.87	J
	5/23/2005	U		U		1.4	J	U		U		U		U		U		U	J4	**36**		U		U		0.44	J	U		U	
	9/12/2005	U		U		U		U		U		U		U		U		U		**300**		U		U		U		U		U	
	9/12/2005^{c}	U		U		0.54	J	U		U		U		U		U		U		**480**	J8	U		0.53	J	U		U		U	
	12/19/2005	U		U		U		U		U		U		U		U		U	J3	**300**		U		0.57	J	0.32	J	U		U	
	3/30/2006	U		U		U		U		U		U		U		U		U		**450**		U		0.67	J	0.44	J	U		U	
	3/30/2006^{c}	U		0.36	J	U		U		U		U		U		U		U	J3	**210**		1.1	J	0.44	J	0.31	J	U		U	
	6/21/2006	U		U		0.98	J	U		U		U	J4	U		U		U		**500**		U		0.83	J	U		U		U	
	8/30/2006	U	J4	U		0.63	J	U		0.94	J	U		U		U		U		**460**		U		0.65	J	U		U		U	
	12/12/2006	U		U		1.2	J	U		U		U		U		U		U	J3	**150**	T2	U		0.77	J	0.36	J	U		U	
	3/23/2007	U		U		0.84	J	U		U		U		U		U		1.7	J.J3	**250**		U		0.33	J	U		U		U	
	6/5/2007	U		U		U		U		U		U		U		U		U		**300**		U		U		U		U		U	
	9/19/2007	U		U		1.5	J	U		U		U		U		U		U		**140**		U		U		U		U		U	
	12/12/2007	U		U		0.82	J	U		U		U		U		U		U		**94**		U		U		U		U		U	
	3/19/2008	U		U		0.76	J	U		U		U		U		U		U		**26**		U		U		U		U		U	
	6/4/2008	U		U		0.76	J	U		U		U		U		U		U		**52**		U		U		U		U		U	
	9/10/2008	U		U		0.89		U		U		U		U		U		U		**99**		U		U		U		U		U	
	12/12/2008	U		U		0.89		U		U		U		U		U		U		**110**		U		U		U		U		U	
	12/12/2008^{c}	U		U		0.89		U		U		U		U		U		U		**110**		U		U		U		U		U	
	5/29/2010	U		U		0.76	J	U		U		U		U		U		U		**8.0**		U		U		U		U		U	
	10/21/2010	U		U		3.45		U		U		U		U		U		U		**95.0**		U		U		U		U		U	
	1/31/2011	U		U		4.30		U		U		U		U		U		U		**124.0**	D2	U		U		U		U		U	
	4/14/2011	U		U		3.6		U		U		U		U		U		U		**49**		U		U		U		U		U	
	10/13/2011	U		U		1.4		U		U		U		U		U		U		**7.1**		U		U		U		U		U	
	1/26/2012	U	L3	U		0.50		U		U		U		U		U		U		2.4		U		U		U		U		U	
	1/26/2012^{c}	U	L3	U		U		U		U		U		U		U		U		2.3		U		U		U		U		U	
	4/27/2012	U		U		2.0		U		U		U		U		U		U		**22**		U		U		U		U		U	
	4/27/2012^{c}	U		U		1.7		U		U		U		U		U		U		**20**		U		U		U		U		U	
	10/11/2012	U		U		1.0		U		U		U		U		U		U		4.6		U		U		U		U		U	
	1/23/2013	U		U		0.94		U		U		U		U		U		U		1.8		U		U		U		U		U	
	4/18/2013	U	L5	U		0.76		U		U		U		U		U		U		0.93		U		U		U		U		U	
	7/16/13 122'	U		U		1.3		U		U		U		U		U		U		1.4		U		U		U		U		U	
	7/16/13 122'^{c}	U		U		1.3		U		U		U		U		U		U		1.4		U		U		U		U		U	
	7/16/13 141'-143'	U		U		1.4		U		U		U		U		U		U		1.3		U		U		U		U		U	
	7/16/13 155'-157'	11		U		1.7		U		U		U		U		U		U		1.3		U		U		U		U		U	
	10/24/2013	U		U		1.3		U		U		U		U		U		U		0.64		U		U		U		U		U	
	1/17/2014	**22**		U		1.3		U		U		U		U		U		U		0.65		U		U		U		U		U	
	1/17/2014^{c}	U	V1	U		1.2		U		U		U		U		U		U		0.54		U		U		U		U		U	
	4/15/2014	U		U		1.0		U		U		U		U		U		U		U		U		U		U		U		U	
	7/17/2014	U		U		1.3		U		U		U		U		U		U		U		U		U		U		U		U	
	12/11/2014	U		U		0.63		U		U		U		U		U		U		U		U		U		U		U		U	
	2/24/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5**[a]		**100**[b]		**70**		**5**[a]		**NE**		**700**[a]				**NE**		**5**[a]		**1000**[a]		**5**[a]		**NE**		**NE**		**10000**[a]	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-104S	3/28/2005	U		U		0.61	J	U		U		U		0.46	J	U		U		**7.6**		0.5	J	4.2		0.95	J	U		1.9	J
	5/23/2005	U		U		U		U		U		U		U		U		U	J4	**10**		U		4.9		0.56	J	U		U	
	9/12/2005	U		U		U		U		U		U		U		U		U		2.6		U		2		U		U		U	
	12/19/2005	U		U		U		U		U		U		U		U		U		**5.1**		U		3		0.39	J	U		U	
	3/30/2006	U		U		U		U		U		U		U		U		U		**13**		U		4.6		0.37	J	U		U	
	6/20/2006	23	J	U		0.81	J, J4	U		U		U		U		U		U		**21**		U		4.9		U		U		U	
	8/31/2006	U		U		U		U		U		U		U		U		U		**14**		U		3.2		U		U		U	
	12/11/2006	U		U		0.64	J	U		U		U		U		U		U		**27**		U		**6.2**		U		U		U	
	3/22/2007	U		U		0.6	J	U		U		U		U		U		U		**32**		U		**5.1**		U		U		U	
	6/4/2007	U		U		0.76	J	U		U		U		U		U		U		**22**		U		4.8		U		U		U	
	6/4/2007 [c]	U		U		0.74	J	U		U		U		U		U		0.39	J	**21**		U		4.8		U		U		U	
	9/19/2007	U		U		0.97	J	U		U		U		U		U		U		**31**		U		3.4		U		U		U	
	12/12/2007	U		U		0.69	J	U		U		U		U		U		U		**32**		U		3.1		U		U		U	
	3/19/2008	U		U		1.1	J	U		U		U		U		U		U		**30**		U		2.8		U		U		U	
	6/3/2008	U		U		0.71	J	U		U		U		U		U		U		**25**		U		2.4		U		U		U	
	9/10/2008	U		U		0.81		U		U		U		U		U		U		**28**		U		3.5		U		U		U	
	12/11/2008	U		U		0.83		U		U		U		U		U		U		**25**		U		3.2		U		U		U	
	5/29/2010	U		U		1.2	J	U		U		U		U		U		U		**30**		U		2.5		U		U		U	
	10/19/2010	U		U		1.13		U		U		U		U		U		U		**30.7**		U		2.64		U		U		U	
	10/19/2010 [c]	U		U		1.13		U		U		U		U		U		U		**28.4**		U		2.56		U		U		U	
	1/27/2011	U		U		1.20		U		U		U		U		U		U		**30.0**		U		2.20		U		U		U	
	4/12/2011	U		U		1.0		U		U		U		U		U		U		**34**		U		2.3		U		U		U	
	10/11/2011	U		U		1.3		U		U		U		U		U		U	L3	**33**		U		2.4		U		U		U	
	1/25/2012	U	L3	U		1.3		U		U		U		U		U		U		**32**		U		1.8		U		U		U	
	4/26/2012	U	V1	U		1.2		U		U		U		U		U		U		**23**		U		1.4		U		U		U	
	4/26/2012 [c]	U	V1	U		1.3		U		U		U		U		U		U		**33**		U		1.6		U		U		U	
	10/11/2012	U		U		1.1		U		U		U		U		U		U		**23**		U		0.65		U		U		U	
	1/23/2013	U		U		1.3		U		U		U		U		U		U		**25**		U		0.72		U		U		U	
	4/17/2013	U	L5	U		1.6		U		U		U		U		U		U		**20**		U		0.69		U		U		U	
	7/15/2013	U		U		1.6		U		U		U		U		U		U		**28**		U		0.71		U		U		U	
	10/23/2013	U		U		1.6		U		U		U		U		U		U		**19**		U		0.93		U		U		U	
	1/16/2014	**27**		U		1.6		U		U		U		U		U		U		**31**		U		2.6		U		U		U	
	4/10/2014	U		U		1.4		U		U		U		U		U		U		**27**		U		2.8		U		U		U	
	7/16/2014	U		U		1.2		U		U		U		U		U		U		**31**		U		3.7		U		U		U	
	12/11/2014	U		U		1.2		U		U		U		U		U		U		**10**		U		3.0		U		U		U	
	2/26/2015	U		U		1.2		U		U		U		U		U		U		**22**		U		3.5		U		U		U	
MW-104D	3/28/2005	U		U		U		U		U		U		U		U		U		U		0.39	J	U		U		U		U	
	5/27/2005	U		U		U		U		U		0.63	J	U		U		U		U		U		U		U		U		U	
	9/13/2005	U		U		U		U		U		U		U		U		U		0.59	J	U		U		U		U		U	
	12/19/2005	U		U		U		U		U		U		U		U		U	J3	U		0.57	J	U		U		U		U	
	3/31/2006	U		U		U		U		U		U		U		U		U		U		3.5	J	U		U		U		U	
	6/15/2006	U		U	J	U	J4	U		U		U	J4	U		U		0.6	J	U		0.56	J	U		U		U		U	
	8/1/2006	U	J4	U		U		U		U		U		U		U		U		0.44	J	1.1	J	U		U		U		U	
	12/15/2006	18	J	U		U		U		U		U		U		U		U		U		0.32	J	U		U		U		U	
	3/22/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	6/4/2007	U		U		U		U		U		U		U		U		U		U		41		U		U		U		U	
	9/19/2007	U		U		U		U		U		U		U		U		U		U		6.1		U		U		U		U	
	12/21/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	3/19/2008	U		U		U		U		U		U		U		U		U		U		14		U		U		U		U	
	6/3/2008	U		U		U		U		U		U		U		U		U		U		29		U		U		U		U	
	9/8/2008	U		U		U		U		U		U		U		U		U		U		35		U		U		U		U	
	12/10/2008	U		U		U		U		U		U		U		U		U		U		8.0		U		U		U		1.0	
	5/29/2010	U		U		U		U		U		U		U		U		U		U		21.0		U		U		U		U	
	10/22/2010	U		U		U		U		U		U		U		U		U		U		54.8		U		U		U		U	
	4/15/2011	U		U		U		U		U		U		U		U		U		U		2.6		U		U		U		U	
	10/14/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	4/26/2012	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	10/12/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	4/19/2013	U	L5	U		U		U		U		U		U		U		U		U		2.5		U		U		U		U	
	10/17/2013	U		U		U		U		U		U		U		U		U		U		10		U		U		U		U	
	4/8/2014	U		U		U		U		U		U		U		U		U		U		1.1		U		U		U		U	
	12/11/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	2/26/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5^{a}**		**100^{b}**		**70**		**5^{a}**		**NE**		**700^{a}**				**NE**		**5^{a}**		**1000^{a}**		**5^{a}**		**NE**		**NE**		**10000^{a}**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-105	6/21/2006	U		U		1.9	J	U		U		U	J4	U		U		U		**130**		U		U		U		U		U	
	8/31/2006	U		U		2.4	J	U		U		U		U		U		U		**47**		U		U		U		U		U	
	8/31/2006^{c}	U		U		2.3	J	U		U		U		U		U		U		**97**		U		U		U		U		U	
	12/12/2006	U		U		3.6	J	U		U		U		U		U		U	J3	**94**		U		U		U		U		U	
	12/12/2006^{c}	U		U		3.9	J	U		U		U		U		U		U	J3	**110**		U		U		U		U		U	
	3/23/2007	U		U		1.3	J	U		U		U		U		U		1.7	J,J3	**490**		U		0.89		U		U		U	
	6/4/2007	U		U		3.7	J	U		U		U		U		U		U		**110**		U		U		U		U		U	
	9/18/2007	U		U		2.4	J	U		U		U		U		U		U		**140**		U		U		U		U		U	
	9/18/2007^{c}	U		U		2.6	J	U		U		U		U		U		U		**140**		U		U		U		U		U	
	12/11/2007	U		U		2.2	J	U		U		U		U		U		U		**58**		U		U		U		U		U	
	3/19/2008	U		U		1.7	J	U		U		U		U		U		U		**63**		U		U		U		U		U	
	6/4/2008	U		U		2.6	J	U		U		U		U		U		U		**36**		U		U		U		U		U	
	9/9/2008	U		U		5.2		U		U		U		U		U		U		**52**		U		U		U		U		U	
	12/11/2008	U		U		3.9		U		U		U		U		U		U		**45**		U		U		U		U		U	
	6/29/2010	U		U		U		U		U		U		U		U		U		**32**		U		U		U		U		U	
	6/29/2010^{c}	U		U		U		U		U		U		U		U		U		**35**		U		U		U		U		U	
	10/20/2010	U		U		2.28		U		U		U		U		U		U		**10.3**		U		U		U		U		U	
	1/27/2011	U		U		2.07		U		U		U		U		U		U		**12.3**		U		U		U		U		U	
	4/11/2011	U		U		1.8		U		U		U		U		U		U		**11**		U		U		U		U		U	
	4/11/2011^{c}	U		U		1.8		U		U		U		U		U		U		**11**		U		U		U		U		U	
	10/12/2011	U		U		2.3		U		U		U		U		U		U	L3	**12**		U		U		U		U		U	
	1/25/2012	U	L3	U		2.2		U		U		U		U		U		U		**12**		U		U		U		U		U	
	4/26/2012	U	V1	U		1.7		U		U		U		U		U		U		**7.8**		U		U		U		U		U	
	10/10/2012	U		U		1.6		U		U		U		U		U		U		4.4		U		U		U		U		U	
	1/22/2013	U		U		3.1		U		U		U		U		U		U		**43**		U		U		U		U		U	
	4/16/2013	U	L5	U		3.1		U		U		U		U		U		U		**12**		U		U		U		U		U	
	7/15/2013	U		U		2.5		U		U		U		U		U		U		**7.4**		U		U		U		U		U	
	10/21/2013	U		U		2.8		U		U		U		U		U		U		**5.2**		U		U		U		U		U	
	1/16/2014	29		U		2.9		U		U		U		U		U		U		**8.8**		U		U		U		U		U	
	4/7/2014	U		U		2.7		U		U		U		U		U		U		**9.0**		U		U		U		U		U	
	7/15/2014	U		U		2.8		U		U		U		U		U		U		**7.6**		U		U		U		U		U	
	12/11/2014	U		U		1.4		U		U		U		U		U		U		0.51		U		U		U		U		U	
	12/11/2014^{c}	U		U		0.99		U		U		U		U		U		1.3	B1, E4	0.26	E4	U		U		U		U		U	
	2/24/2015	U		U		0.89		U		U		U		U		U		U		1.4		U		U		U		U		U	
	2/24/2015^{c}	U		U		0.89		U		U		U		U		U		U		1.1		U		U		U		U		U	
MW-106	12/11/2006	U		U		0.99	J	U		U		U		U				U	J3	**30**		U		**22**		0.38	J	0.86	J	U	
	3/23/2007	U		U		0.88	J	U		U		U		U				1.7	J,J3	**19**		U		**25**		U		U		U	
	6/4/2007	U		U		1.2	J	U		U		U		U		0.32	J	U		**35**		U		**17**		U		U		U	
	9/18/2007	U		U		1.2	J	U		U		U		U		U		U		**55**		U		**40**		U		U		U	
	12/11/2007	U		U		0.86	J	U		U		U		U		U		U		**49**		U		**26**		U		U		U	
	3/18/2008	U		U		1.1	J	0.46	J	U		U		U		U		U		**100**		U		**26**		U		U		U	
	3/18/2008^{c}	U		U		1.1	J	U		U		U		U		U		U		**95**		U		27		U		U		U	
	6/4/2008	U		U		1.1	J	U		U		U		U		U		U		**120**		U		**25**		U		U		U	
	6/4/2008^{c}	U		U		1.2	J	U		U		U		U		U		U		**120**		U		25		U		U		U	
	9/9/2008	U		U		1.4		U		U		U		U		U		U		**58**		U		**20**		U		U		U	
	9/9/2008^{c}	U		U		1.5		U		U		U		U		U		U		**60**		U		21		U		U		U	
	12/11/2008	U		U		1.6		U		U		U		U		U		U		**37**		U		**18**		U		U		U	
	12/11/2008^{c}	U		U		1.5		U		U		U		U		U		U		**41**		U		18		U		U		U	
	6/30/2010	U		U		U		U		U		U		U		U		U		**19**		U		**9.4**		U		U		U	
	10/20/2010	U		U		2.00		U		U		U		U		U		U		**32.4**		U		**11.2**		U		U		U	
	1/28/2011	U		U		1.97		U		U		U		U		U		U		**30.8**		U		**14.2**		U		U		U	
	4/14/2011	U		U		1.9		U		U		U		U		U		U		**28**		U		**14**		U		U		U	
	10/12/2011	U		U		2.2		U		U		U		U		U		U	L3	**31**		U		**17**		U		U		U	
	10/12/2011^{c}	U		U		2.3		U		U		U		U		U		U	L3	**31**		U		**18**		U		U		U	
	1/25/2012	U	L3	U		2.1		U		U		U		U		U		U		**33**		U		**17**		U		U		U	
	4/26/2012	U	V1	U		2.0		U		U		U		U		U		U		**29**		U		**15**		U		U		U	
	10/11/2012	U		U		1.5		U		U		U		U		U		U		**31**		U		**16**		U		U		U	
	10/11/2012^{c}	U		U		1.6		U		U		U		U		U		U		**35**		U		**18**		U		U		U	
	1/22/2013	U		U		1.3		U		U		U		U		U		U		**46**		U		**15**		U		U		U	
	4/17/2013	U	L5	U		1.1		U		U		U		U		U		U		**46**		U		**11**		U		U		U	
	7/15/2013	U		U		1.2		U		U		U		U		U		U		**59**		U		**12**		U		U		U	
	10/23/2013	U		U		0.93		U		U		U		U		U		U		**40**		U		**6.7**		U		U		U	
	1/17/2014	**26**		U		0.61		U		U		U		U		U		U		**28**		U		2.8		U		U		U	
	4/15/2014	U		U		U		U		U		U		U		U		U		**19**		U		2.4		U		U		U	
	7/17/2014	U		U		0.59		U		U		U		U		U		U		**11**		U		0.93		U		U		U	
	7/17/2014^{c}	U		U		U		U		U		U		U		U		U		**14**		U		1.2		U		U		U	
	12/10/2014	U		U		0.59		U		U		U		U		U		U		4.8		U		0.61		U		U		U	
	2/24/2015	U		U		U		U		U		U		U		U		U		3.7		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
	Parameter	Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
	Units	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	**NE**		**5**[a]		**100**[b]		**70**		**5**[a]		**NE**		**700**[a]				**NE**		**5**[a]		**1000**[a]		**5**[a]		**NE**		**NE**		**10000**[a]	
	Reported Detection Limit ESC (Prior to 9/08)	50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
	Reported Detection Limit Test America (Post 9/08)	10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
	Reported Detection Limit Test America (As of 1/11)	10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-107	6/6/2007	U		U		2	J	U		U		U		U		U	J4	0.79	J	**16**		1.6	J	U		U		U		U	
	9/17/2007	U		U		1.9	J	U		U		U		U		U		U		**7.3**		U		U		U		U		U	
	12/10/2007	U		U		2.4	J	U		U		U		U		U		U		4.9		U		U		U		U		U	
	3/17/2008	U		U		2.8	J	U		U		U		U		U		U		4		U		U		U		U		U	
	6/2/2008	U		U		3	J	U		U		U		U		U		U		4.6		U		U		U		U		U	
	9/9/2008	U		U		1.9		U		U		U		U		U		U		**6.3**		U		U		U		U		U	
	12/9/2008	U		U		1.5		U		U		U		U		U		U		**8.2**		U		U		U		U		U	
	6/30/2010	U		U		U		U		U		U		U		U		U		3.6		U		U		U		U		U	
	10/18/2010	U		U		1.02		U		U		U		U		U		U		**9.05**		U		U		U		U		U	
	4/11/2011	U		U		1.4		U		U		U		U		U		U		3.6		U		U		U		U		U	
	10/10/2011	U		U		1.9		U		U		U		U		U		U	L3	2.5		U		U		U		U		U	
	4/24/2012	U	N1	U		1.8		U		U		U		U		U		U		2.6		U		U		U		U		U	
	10/9/2012	U		U		1.4		U		U		U		U		U		U		1.7		U		U		U		U		U	
	4/16/2013	U	L5	U		1.5		U		U		U		U		U		U		1.3		U		U		U		U		U	
	10/21/2013	U		U		1.9		U		U		U		U		U		U		1.0		U		U		U		U		U	
	4/7/2014	U		U		1.6		U		U		U		U		U		U		0.61		U		U		U		U		U	
	12/11/2014	U		U		2.1		U		U		U		U		U		U		U		U		U		U		U		U	
	2/25/2015	U		U		2.1		U		U		U		U		U		U		U		U		U		U		U		U	
MW-108	6/7/2007	U		U		1.2	J	U		U		U		U		U	J4	U		0.88		20		U		U		U		U	
	9/17/2007	U		U		0.72	J	U		U		U		U		U		U		3.5		U		1.1		U		U		U	
	12/10/2007	U		U		1.2	J	U		U		U		U		U		U		1.2		U		U		U		U		U	
	3/18/2008	U		U		0.8	J	U		U		U		U		U		U		**5.1**		U		2.2		U		U		U	
	6/3/2008	U		U		0.56	J	U		U		U		U		U		U		**5.4**		U		1.7		U		U		U	
	9/9/2008	U		U		0.62		U		U		U		U		U		U		**7.6**		U		2.2		U		U		U	
	12/10/2008	U		U		0.53		U		U		U		U		U		U		**7.2**		U		1.5		U		U		U	
	6/29/2010	U		U		U		U		U		U		U		U		U		**11**		U		1.3		U		U		U	
	10/20/2010	U		U		0.650		U		U		U		U		U		U		**11.9**		U		1.22		U		U		U	
	4/13/2011	U		U		0.66		U		U		U		U		U		U		**12**		U		1.1		U		U		U	
	10/13/2011	U		U		0.79		U		U		U		U		U		U		**15**		U		1.4		U		U		U	
	4/25/2012	U	V1	U		0.72		U		U		U		U		U		U		**14**		U		1.2		U		U		U	
	10/10/2012	U		U		0.86		U		U		U		U		U		U		**13**		U		0.95		U		U		U	
	4/17/2013	U	L5	U		1.2		U		U		U		U		U		U		**12**		U		1.6		U		U		U	
	10/23/2013	U		U		1.6		U		U		U		U		U		U		**11**		U		U		U		U		U	
	4/11/2014	U		U		1.5		U		U		U		U		U		U		**12**		U		1.9		U		U		U	
	12/12/2014	U		U		0.92		U		U		U		U		U		U		2.7		U		0.75		U		U		U	
	2/25/2015	U		U		0.82		U		U		U		U		U		U		**6.7**		U		1.1		U		U		U	
MW-109	6/7/2007	U		U		0.78	J	U		U		U		U		U		U		**16**		7.8		1.8		U		U		U	
	9/17/2007	U		U		0.46	J	U		U		U		U		U		U		**16**		U		2.2		U		U		U	
	12/10/2007	U		U		U		U		U		U		U		U		U		**17**		U		2.3		U		U		U	
	3/18/2008	U		U		1.1	J	U		U		U		U		U		U		**37**		U		2.1		U		U		U	
	6/3/2008	U		U		0.64	J	U		U		U		U		U		U		**19**		U		1.7		U		U		U	
	9/9/2008	U		U		0.72		U		U		U		U		U		U		**24**		U		1.8		U		U			
	12/10/2008	U		U		U		U		U		U		U		U		U		**20**		U		1.2		U		U		U	
	6/29/2010	U		U		U		U		U		U		U		U		U		**16**		U		U		U		U		U	
	10/19/2010	U		U		0.820		U		U		U		U		U		U		**19.4**		U		1.08		U		U		U	
	4/13/2011	U		U		0.63		U		U		U		U		U		U		**20**		U		0.93		U		U		U	
	10/12/2011	U		U		0.75		U		U		U		U		U		U	L3	**24**		U		1.2		U		U		U	
	4/25/2012	U	V1	U		0.69		U		U		U		U		U		U		**17**		U		0.83		U		U		U	
	10/10/2012	U		U		0.75		U		U		U		U		U		U		**20**		U		0.78		U		U		U	
	4/17/2013	U	L5	U		0.90		U		U		U		U		U		U		**18**		U		0.86		U		U		U	
	10/23/2013	U		U		0.97		U		U		U		U		U		U		**17**		U		0.76		U		U		U	
	4/11/2014	U		U		0.95		U		U		U		U		U		U		**18**		U		1.0		U		U		U	
	12/12/2014	U		U		1.1		U		U		U		U		U		U		**15**		U		1.7		U		U		U	
	2/25/2015	U		U		1.1		U		U		U		U		U		U		**18**		U		2.0		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5[a]**		**100[b]**		**70**		**5[a]**		**NE**		**700[a]**				**NE**		**5[a]**		**1000[a]**		**5[a]**		**NE**		**NE**		**10000[a]**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-110	3/18/2008	U		U		0.48	J	U		U		U		U		U		U		**15**		U		2.2		U		U		U	
	6/3/2008	U		U		1	J	U		U		U		U		U		U		**37**		U		2.3		U		U		U	
	9/8/2008	U		U		0.81		U		U		U		U		U		2.5		**38**		U		2.3		U		U		U	
	12/10/2008	U		U		0.65		U		U		U		U		U		U		**36**		U		1.8		U		U		U	
	6/28/2010	U		U		U		U		U		U		U		U		U		**31**		U		1.3		U		U		U	
	10/19/2010	U		U		0.94		U		U		U		U		U		U		**30.1**		U		1.48		U		U		U	
	4/13/2011	U		U		0.69		U		U		U		U		U		U		**28**		U		1.2		U		U		U	
	10/13/2011	U		U		0.88		U		U		U		U		U		U		**31**		U		1.4		U		U		U	
	4/25/2012	U	V1	U		0.61		U		U		U		U		U		U		**18**		U		0.69		U		U		U	
	10/11/2012	U		U		0.82		U		U		U		U		U		U		**23**		U		0.54		U		U		U	
	4/16/2013	U	L5	U		1.2		U		U		U		U		U		U		**20**		U		U		U		U		U	
	10/22/2013	U		U		1.7		U		U		U		U		U		U		**19**		U		U		U		U		U	
	4/9/2014	U		U		1.5		U		U		U		U		U		U		**22**		U		0.58		U		U		U	
	12/12/2014	U		U		1.2		U		U		U		U		U		U		**11**		U		1.0		U		U		U	
	2/25/2015	U		U		1.4		U		U		U		U		U		U		**17**		U		1.1		U		U		U	
MW-111	3/17/2008	17	J	U		1.5	J	U		U		U		U		U		U		**8.1**		U		U		U		U		U	
	6/2/2008	U		U		2.1	J	U		U		U		U		U		U		**11**		U		U		U		U		U	
	9/8/2008	U		U		2.3		U		U		U		U		U		U		**13**		U		U		U		U		U	
	12/9/2008	U		U		2.4		U		U		U		U		U		U		**14**		U		U		U		U		U	
	6/28/2010	U		U		U		U		U		U		U		U		U		**14**		U		U		U		U		U	
	10/18/2010	U		U		2.43		U		U		U		U		U		U		**23.9**		U		U		U		U		U	
	4/12/2011	U		U		2.0		U		U		U		U		U		U		**24**		U		U		U		U		U	
	10/10/2011	U		U		2.5		U		U		U		U		U		U	L3	**21**		U		U		U		U		U	
	4/24/2012	U	N1	U		3.0		U		U		U		U		U		U		**18**		U		U		U		U		U	
	10/9/2012	U		U		2.4		U		U		U		U		U		U		**10**		U		U		U		U		U	
	4/16/2013	U	L5	U		2.0		U		U		U		U		U		U		**6.1**		U		U		U		U		U	
	10/22/2013	U		U		2.1		U		U		U		U		U		U		4.5		U		U		U		U		U	
	4/7/2014	U		U		1.7		U		U		U		U		U		U		4.2		U		U		U		U		U	
	12/10/2014	U		U		1.5		U		U		U		U		U		U		1.3		U		U		U		U		U	
	2/25/2015	U		U		1.6		U		U		U		U		U		U		2.2		U		U		U		U		U	
MW-112	3/17/2008	U		U		0.7	J	U		U		U		U		U		U		U		U		U		U		U		U	
	6/2/2008	U		U		0.69	J	U		U		U		U		U		U		U		U		U		U		U		U	
	9/8/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	12/9/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	6/28/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	10/18/2010	U		U		1.15		U		U		U		U		U		U		U		U		U		U		U		U	
	4/12/2011	U		U		1.7		U		U		U		U		U		U		U		U		U		U		U		U	
	10/11/2011	U		U		2.3		U		U		U		U		U		U	L3	U		U		U		U		U		U	
	4/25/2012	U	V1	U		2.0		U		U		U		U		U		U		U		U		U		U		U		U	
	10/9/2012	U	M2	U		1.8		U		U		U		U		U		U		U		U		U		U		U		U	
	4/16/2013	U	R6	U		1.4		U		U		U		U		U		U		U		U		U		U		U		U	
	10/22/2013	U		U		1.9		U		U		U		U		U		U		U		U		U		U		U		U	
	4/9/2014	U		U		1.4		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014	U		U		1.0		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014[c]	U		U		1.1		U		U		U		U		U		U		U		U		U		U		U		U	
	2/25/2015	U		U		0.96		U		U		U		U		U		U		U		U		U		U		U		U	
MW-113	7/18/2011	U		U		U		U		U		U		U		U		U		1.6		1.3		U		U		U		U	
	10/11/2011	U		U		U		U		U		U		U		U		U	L3	3.0		U		U		U		U		U	
	4/24/2012	U	N1	U		U		U		U		U		U		U		U		2.6		U		U		U		U		U	
	10/9/2012	U		U		U		U		U		U		U		U		U		0.70		U		U		U		U		U	
	4/17/2013	U	R6	U		U		U		U		U		U		U		U		0.56		U		U		U		U		U	
	10/21/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	4/8/2014	U		U		U		U		U		U		U		U		U		0.76		U		U		U		U		U	
	12/10/2014	U		U		0.24	E4	U		U		U		U		U		U		1.2		U		U		U		U		U	
	2/25/2015	U		U		U		U		U		U		U		U		U		1.2		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-114	7/18/2011	U		U		0.70		U		U		U		U		U		U		**9.5**		1.4		U		U		U		U	
	10/11/2011	U		U		1.4		U		U		U		U		U		U	L3	**20**		U		U		U		U		U	
	4/24/2012	U	N1	U		1.2		U		U		U		U		U		U		**18**		U		U		U		U		U	
	10/9/2012	U		U		0.67		U		U		U		U		U		U		**19**		U		U		U		U		U	
	10/9/2012 ^{c}	U		U		0.71		U		U		U		U		U		U		**20**		U		U		U		U		U	
	4/17/2013	U	R6	U		0.92		U		U		U		U		U		U		**14**		U		U		U		U		U	
	4/17/2013 ^{c}	U	R6	U		0.96		U		U		U		U		U		U		**14**		U		U		U		U		U	
	10/22/2013	U		U		1.8		U		U		U		U		U		U		**11**		U		U		U		U		U	
	4/8/2014	U		U		1.8		U		U		U		U		U		U		**9.6**		U		U		U		U		U	
	12/10/2014	U		U		1.9		U		U		U		U		U		U		4.3		U		U		U		U		U	
	2/25/2015	U		U		2.2		U		U		U		U		U		U		**5.6**		U		U		U		U		U	
MW-115	10/25/2013	U		U		U		U		U		U		U		U		U		**11**		U		1.1		U		U		U	
	4/11/2014	U		U		U		U		U		U		U		U		U		**6.1**		U		U		U		U		U	
	12/10/2014	U		U		0.39	E4	U		U		U		U		U		U		1.2		U		U		U		U		U	
	2/25/2015	U		U		U		U		U		U		U		U		U		1.9		U		U		U		U		U	
MW-116	10/25/2013	U		U		1.3		U		U		U		U		U		U		**25**		14		0.81		U		U		U	
	10/25/2013 ^{c}	U		U		1.5		U		U		U		U		U		U		**24**		U		0.79		U		U		U	
	4/14/2014	U		U		1.5		U		U		U		U		U		U		**19**		U		U		U		U		U	
	4/14/2014 ^{c}	U		U		1.6		U		U		U		U		U		U		**19**		U		U		U		U		U	
	12/10/2014	U		U		0.96		U		U		U		U		U		U		**12**		U		0.44	E4	U		U		U	
	2/26/2015	U		U		0.92		U		U		U		U		U		U		**16**		U		0.82		U		U		U	
	2/26/2015 ^{c}	U		U		0.83		U		U		U		U		U		U		**17**		U		0.86		U		U		U	
MW-117	10/25/2013	U		U		0.89		U		U		U		U		U		U		**32**		14		U		U		U		U	
	4/11/2014	U		U		0.50		U		U		U		U		U		U		**13**		U		0.51		U		U		U	
	4/11/2014 ^{c}	U		U		0.53		U		U		U		U		U		U		**13**		U		0.51		U		U		U	
	12/10/2014	U		U		0.38	E4	U		U		U		U		U		U		1.9		U		U		U		U		U	
	2/24/2015	U		U		U		U		U		U		U		U		U		**6.0**		U		**7.6**		U		U		U	
MW-118	10/25/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	10/25/2013 ^{c}	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	4/14/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014	U		U		0.29	E4	U		U		U		U		U		U		U		U		U		U		U		U	
	2/25/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-119S	10/24/2013	U		U		U		U		U		U		U		U		U		**11**		U		U		U		U		U	
	1/16/2014	U		U		U		U		U		U		U		U		U		**6.3**		U		U		U		U		U	
	4/14/2014	U		U		U		U		U		U		U		U		U		4.3		U		U		U		U		U	
	7/17/2014	U		U		U		U		U		U		U		U		U		3.6		U		U		U		U		U	
	12/10/2014	U		U		0.41	E4	U		U		U		U		U		U		0.42	E4	U		U		U		U		U	
	2/25/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-119D	10/18/2013	U		U		320		U		U		U		U		U		U		4.2		14		U		U		U		U	
	1/15/2014	U		U		23		U		U		U		U		U		U		7.3		7.5		U		U		U		U	
	4/9/2014	U		U		5.4		U		U		U		U		U		U		**7.2**		2.7		U		U		U		U	
	7/16/2014	U		U		5.7		U		U		U		U		U		U		4.9		4.2		U		U		U		U	
	12/11/2014	U		U		54	E4	U		U		U		U		U		U		0.23	E4	U		U		U		U		U	
	2/26/2015	U		U		21		U		U		U		0.70		U		U		U		U		U		U		U		4.7	
TOG-G2	4/24/2012	U	N1	U		0.99		U		U		U		U		U		U		U		U		U		U		U		U	

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5**[a]		**100**[b]		**70**		**5**[a]		**NE**		**700**[a]				**NE**		**5**[a]		**1000**[a]		**5**[a]		**NE**		**NE**		**10000**[a]	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-G7	3/28/2005	U		U		4.7	J, J5	U		U	J5	U		U		U		U		U		0.4	J	U		U		U		U	
	5/23/2005	U		U		2.3	J	U		U		U		U		U		U	J4	U		U		U		U		U		U	
	9/13/2005	U		U		3.8	J	U		U		U		U		U		U		U		U		U		U		U		U	
	12/19/2005	U		U		2.6	J	U		U		U		U		U		U	J3	U		U		U		U		U		U	
	3/30/2006	U		U		2.5	J	U		U		U		U		U		U		U		U		U		U		U		U	
	6/20/2006	**19**	J	U		2.5	J, J4	U		U		U		U		U		U		U		U		U		U		U		U	
	8/31/2006	U		U		1.8	J	U		U		U		U		U		U		U		U		U		U		U		U	
	12/11/2006	U		U		3.2	J	U		U		U		U		U		U	J3	0.47	J	U		U		U		U		U	
	3/22/2007	U		U		1.3	J	U		U		U		U		U		U		U		U		U		U		U		U	
	6/4/2007	U		U		1.2	J	U		U		U		U		U		U		U		U		U		U		U		U	
	9/17/2007	U		U		0.86	J	U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	3/18/2008	U		U		0.41	J	U		U		U		U		U		U		U		3.6		U		U		U		U	
	6/2/2008	U		U		0.52	J	U		U		U		U		U		U		0.36	J	U		U		U		U		U	
	9/10/2008	U		U		0.69		U		U		U		U		U		U		U		U		U		U		U		U	
	12/9/2008	U		U		0.85		U		U		U		U		U		U		U		U		U		U		U		U	
	6/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	10/19/2010	U		U		1.19		U		U		U		U		U		U		U		U		U		U		U		U	
	1/28/2011	U		U		1.48		U		U		U		U		U		U		U		U		U		U		U		U	
	4/12/2011	U		U		1.4		U		U		U		U		U		U		U		U		U		U		U		U	
	10/13/2011	U		U		2.7		U		U		U		U		U		U		0.51		U		U		U		U		U	
	1/24/2012	U	L3	U		2.1		U		U		U		U		U		U		0.94		U		U		U		U		U	
	4/24/2012	U	N1	U		2.4		U		U		U		U		U		U		U		U		U		U		U		U	
	10/10/2012	U		U		2.4		U		U		U		U		U		U		U		U		U		U		U		U	
	1/23/2013	U		U		2.0		U		U		U		U		U		U		U		U		U		U		U		U	
	4/18/2013	U	R6	U		1.9		U		U		U		U		U		U		U		U		U		U		U		U	
	7/16/2013	U		U		2.9		U		U		U		U		U		U		U		U		U		U		U		U	
	10/23/2013	U		U		2.0		U		U		U		U		U		U		U		U		U		U		U		U	
	1/16/2014	U		U		1.3		U		U		U		U		U		U		U		U		U		U		U		U	
	4/10/2014	U		U		0.87		U		U		U		U		U		U		U		U		U		U		U		U	
	7/15/2014	U		U		0.60		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014	U		U		0.59		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014 [c]	U		U		0.66		U		U		U		U		U		U		U		U		U		U		U		U	
	2/27/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TOG-G8	3/28/2005	U		U		1.8	J	U		U		U		U		U		U		U		0.53	J	U		U		U		U	
	5/23/2005	U		U		1.4	J	U		U		U		U		U		U	J4	U		U		U		U		U		U	
	9/13/2005	U		U		1	J	U		U		U		U	J4	U		U		U		U		U		U	J4	U	J4	U	
	12/19/2005	U		U		1	J	U		U		U		U		U		U	J3	U		U		U		U		U		U	
	3/30/2006	U		U		0.75	J	U		U		U		U		U		U		0.84	J	U		U		U		U		U	
	6/20/2006	**18**	J	U		1.2	J, J4	U		U		U		U		U		U		U		U		U		U		U		U	
	8/31/2006	U		U		0.84	J	U		U		U		U		U		U		U		U		U		U		U		U	
	12/11/2006	U		U		1.5	J	U		U		U		U		U		U		U		U		U		U		U		U	
	3/22/2007	U		U		1.4	J	U		U		U		U		U		U		U		U		U		U		U		U	
	6/4/2007	U		U		1.6	J	U		U		U		U		U		U		U		U		U		U		U		U	
	9/17/2007	U		U		0.97	J, J3	U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2007	U		U		0.8	J	U		U		U		U		U		U		U		U		U		U		U		U	
	3/18/2008	U		U		0.84	J	U		U		U		U		U		U		U		U		U		U		U		U	
	6/2/2008	U		U		0.74	J	U		U		U		U		U		0.61	J	U		U		U		U		U		U	
	9/10/2008	U		U		0.69		U		U		U		U		U		U		U		U		U		U		U		U	
	12/9/2008	U		U		0.63		U		U		U		U		U		U		U		U		U		U		U		U	
	5/29/2010	U		U		1.1	J	U		U		U		U		U		U		U		U		U		U		U		U	
	10/19/2010	U		U		0.830		U		U		U		U		U		U		U		U		U		U		U		U	
	4/12/2011	U		U		0.85		U		U		U		U		U		U		U		U		U		U		U		U	
	10/13/2011	U		U		1.5		U		U		U		U		U		U		U		U		U		U		U		U	
	4/24/2012	U	N1	U		1.6		U		U		U		U		U		U		U		U		U		U		U		U	
	10/10/2012	U		U		1.3		U		U		U		U		U		U		U		U		U		U		U		U	
	4/18/2013	U	R6	U		1.4		U		U		U		U		U		U		U		U		U		U		U		U	
	10/23/2013	U		U		1.4		U		U		U		U		U		U		U		U		U		U		U		U	
	4/10/2014	U		U		1.1		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014	U		U		0.69		U		U		U		U		U		U		U		U		U		U		U		U	
	2/27/2015	U		U		0.70		U		U		U		U		U		U		U		U		U		U		U		U	
	2/27/2015 [c]	U		U		0.78		U		U		U		U		U		U		U		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
	Parameter	Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
	Units	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
	Reported Detection Limit ESC (Prior to 9/08)	50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
	Reported Detection Limit Test America (Post 9/08)	10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
	Reported Detection Limit Test America (As of 1/11)	10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-G9	3/28/2005	U		U		U		U		U		U		U		U		U		3.7		0.56	J	2.5		U		U		U	
	5/23/2005	U		U		U		U		U		U		U		U		U	J4	**5.1**		U		4.5		U		U		U	
	9/13/2005	U		U		0.58	J	U		U		U		U		U		U		**12**		U		**17**		U		U		U	
	12/19/2005	U		U		U		U		U		U		U		U		U	J3	**22**		U		**8.1**		U		U		U	
	3/30/2006	U		0.4	J	U		U		U		U		U		U		U		**20**		0.99	J	**6.2**		U		U		U	
	6/20/2006	**20**	J	U		0.71	J, J4	U		U		U		U		U		U		**28**		U		**5.5**		U		U		U	
	8/31/2006	U		U		U		U		U		U		U		U		U		**32**		U		**5.3**		U		U		U	
	12/11/2006	U		U		0.62	J	U		U		U		U		U		U		**39**		U		**5.8**		U		U		U	
	3/22/2007	U		U		1.2	J	U		U		U		U		U		U		**41**		U		4.2.		U		U		U	
	6/4/2007	U		U		0.88	J	U		U		U		U		U		U		**27**		U		3.8		U		U		U	
	9/17/2007	U		U		0.91	J, J3	U		U		U		U		U		U		**48**		U		4.6		U		U		U	
	12/10/2007	U		U		1.1	J	U		U		U		U		U		U		**39**		U		3.3		U		U		U	
	12/10/2007 ^{c}	U		U		1.1		U		U		U		U		U		U		**39**		U		3.2		U		U		U	
	3/18/2008	U		U		0.91	J	U		U		U		U		U		U		**35**		U		2.7		U		U		U	
	6/2/2008	U		U		0.79	J	U		U		U		U		U		U		**38**		U		2.2		U		U		U	
	9/10/2008	U		U		0.84		U		U		U		U		U		U		**31**		U		2.4		U		U		U	
	12/9/2008	U		U		1.0		U		U		U		U		U		U		**34**		U		2.5		U		U		U	
	5/29/2010	U		U		1.4	J	U		U		U		U		U		U		**29**		U		1		U		U		U	
	10/19/2010	U		U		1.4		U		U		U		U		U		U		**30.7**		U		1.34		U		U		U	
	4/12/2011	U		U		1.2		U		U		U		U		U		U		**31**		U		1.0		U		U		U	
	10/13/2011	U		U		1.6		U		U		U		U		U		U		**33**		U		1.1		U		U		U	
	4/24/2012	U	N1	U		1.8		U		U		U		U		U		U		**33**		U		0.71		U		U		U	
	10/10/2012	U		U		1.5		U		U		U		U		U		U		**31**		U		0.66		U		U		U	
	4/18/2013	U	R6	U		1.5		U		U		U		U		U		U		**23**		U		1.9		U		U		U	
	10/23/2013	U		U		1.8		U		U		U		U		U		U		**30**		U		4.4		U		U		U	
	4/10/2014	U		U		1.3		U		U		U		U		U		U		**45**		U		**5.7**		U		U		U	
	12/10/2014	U		U		0.82		U		U		U		U		U		U		**30**		U		3.2		U		U		U	
	2/27/2015	U		U		1.0		U		U		U		U		U		U		**29**		U		3.2		U		U		U	
TOG-G10	3/28/2005	U		U		U		U		U		U		U		U		U		1.6		0.49	J	U		U		U		U	
	5/23/2005	U		U		U		U		U		U		U		U		U	J4	2.7		U		U		U		U		U	
	9/13/2005	U		U		0.65	J	U		U		U		U		U		U		**7.8**		U		U		U		U		U	
	12/19/2005	U		U		U		U		U		U		U		U		U	J3	**13**		U		U		U		U		U	
	12/19/2005 ^{c}	U		U		U		U		U		U		U		U		U	J3	**13**		U		U		U		U		U	
	3/30/2006	U		U		0.64	J	U		U		U		U		U		U		**6.5**		U		U		U		U		U	
	6/20/2006	**19**	J	U		1.1	J, J4	U		U		U		U		U		U		**18**		U		U		U		U		U	
	8/31/2006	U		U		0.91	J	U		U		U		U		U		U		**50**		U		U		U		U		U	
	12/11/2006	U		U		0.8	J	U		U		U		U		U		U		**120**		U		U		U		U		U	
	3/22/2007	U		U		0.55	J	U		U		U		U		U		U		**54**		U		U		U		U		U	
	6/4/2007	U		U		1.2	J	U		U		U		U		U		U		**200**		U		0.35	J	U		U		U	
	9/17/2007	U		U		0.67	J, J3	U		U		U		U		U		U		**29**		U		U		U		U		U	
	12/10/2007	U		U		U		U		U		U		U		U		U		**13**		U		U		U		U		U	
	3/18/2008	U		U		0.41	J	U		U		U		U		U		U		1.7		U		U		U		U		U	
	6/2/2008	U		U		0.41	J	U		U		U		U		U		U		**6.3**		U		U		U		U		U	
	9/10/2008	U		U		0.59		U		U		U		U		U		U		**39**		U		U		U		U		U	
	12/9/2008	U		U		0.77		U		U		U		U		U		U		**87**		U		U		U		U		U	
	6/29/2010	U		U		U		U		U		U		U		U		U		**77**		U		U		U		U		U	
	10/19/2010	U		U		1.65		U		U		U		U		U		U		**135**	D2	U		0.940		U		U		U	
	1/28/2011	U		U		1.62		U		U		U		U		U		U		**165.0**	D2	U		1.29		U		U		U	
	4/12/2011	U		U		1.2		U		U		U		U		U		U		**130**		U		1.4		U		U		U	
	10/13/2011	U		U		1.4		U		U		U		U		U		U		**150**		U		1.1		U		U		U	
	1/24/2012	U	L3	U		1.1		U		U		U		U		U		U		**66**	M2	U		0.56		U	M2	U		U	
	4/28/2012	**11**		U		**4000**		U		1.7		U		U		U		U		1.3		U		**5.4**		U		U		U	
	10/10/2012	U		U		0.88		U		U		U		U		U		U		**22**		0.70		U		U		U		U	
	1/23/2013	U		U		0.72		U		U		U		U		U		U		**5.4**		0.57		U		U		U		U	
	1/23/2013 ^{c}	U		U		0.70		U		U		U		U		U		U		**5.6**		0.54		U		U		U		U	
	4/18/2013	U	R6	U		0.52		U		U		U		U		U		U		2.5		0.54		U		U		U		U	
	4/18/2013 ^{c}	U	R6	U		0.52		U		U		U		U		U		U		2.5		0.54		U		U		U		U	
	7/16/2013	U		U		0.62		U		U		U		U		U		U		2.0		U		U		U		U		U	
	10/23/2013	U		U		0.64		U		U		U		U		U		U		1.6		U		U		U		U		U	
	1/16/2014	U		U		0.51		U		U		U		U		U		U		1.0		0.69		U		U		U		U	
	1/16/2014 ^{c}	U		U		U		U		U		U		U		U		U		0.93		0.55		U		U		U		U	
	4/10/2014	U		U		U		U		U		U		U		U		U		0.87		2.2		U		U		U		U	
	7/15/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	7/15/2014 ^{c}	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
	12/10/2014	U		U		0.45	E4	U		U		U		U		U		U		0.52		U		U		U		U		U	
	2/27/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

TABLE 6
Historical Groundwater Analytical Results for VOCs
Cooper and Commerce WQARF Site

		Detected Compounds using EPA Method 8260																													
	Parameter	Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
	Units	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
	Reported Detection Limit ESC (Prior to 9/08)	50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
	Reported Detection Limit Test America (Post 9/08)	10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
	Reported Detection Limit Test America (As of 1/11)	10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-R1	4/10/2014	U		U		U		U		U		U		U		U		U		1.1		U		U		U		U		U	
	12/10/2014	U		U		0.31	E4	U		U		U		U		U		U		1.4		U		U		U		U		U	
	2/27/2015	U		U		U		U		U		U		U		U		U		1.8		U		U		U		U		U	
MW-EQ	3/29/2005	U		U		U		U		U		U		U		U		U		U		2.1	J	U		U		U		U	
MW-EQ	5/23/2005	U		U		18		U		U		U		U		U		U	J4	U		U		U		U		U		U	
MW-EQ	9/12/2005	U		U		U		U		U		U		U		U		U		U		0.8	J	U		U		U		U	
MW-EQ	12/19/2005	U		U		U		U		U		U		U		U		U	J3	U		0.53	J	U		U		U		U	
MW-EQ	3/30/2006	U		U		U		U		U		U		U		U		U		U		0.74	J	U		U		U		U	
MW-EQ	6/21/2006	**29**	J	U		U		U		U		U		U		U		0.6	J	U		U		U		1.2		0.45	J	U	
MW-EQ	8/30/2006	U		U		17		U		U		U		U		U		U		0.5	J	0.41	J	U		U		U		U	
MW EQ1	12/11/2006	U		U		U		U		U		U		U		U		U	J3	0.68	J	0.38	J	U		0.39	J	U		U	
MW-EQ-2	12/12/2006	U		U		U		U		U		U		U		U		U	J3	0.7	J	0.41	J	U		0.36	J	0.63	J	U	
MW EQ1	3/21/2007	U		U		U		U		U		U		U		U		0.42	J	U		U		U		U		U		U	
MW-EQ-2	3/23/2007	U		U		U		U		U		U		U		U		0.35	J	U		U		U		U		U		U	
MW-EQ1	6/4/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ2	6/5/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ1	9/17/2007	U		U		U		U		U		U	J4	U		U		U		U		U		U		U		U		U	
MW-EQ2	9/18/2007	U		U		U		U		U		U		U		U		U		0.36	J	U		U		U		U		U	
MW-EQ3	9/19/2007	U		0.32		U		U		U		U		U		U		0.48	J	U		U		U		U		U		U	
MW-EQ3	12/12/2007	U		U		U		U		U		U		U		U		0.45	J	U		U		U		U		U		U	
MW-EQ2	12/11/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ1	12/10/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ1	3/18/2008	U		U		U		U		U		U		U		U		U		U		U		3.7		U		U		U	
MW-EQ2	3/19/2008	U		U		U		U		U		U		U		U		U		U		U		4.5		U		U		U	
MW-EQ3	3/20/2008	**10**	J	U		U		U		U		U		U		U		U		U		0.42	J	U		U		U		U	
EQ-1	6/2/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	6/3/2008	U		U		U		U		U		U		U		U		U		U		0.59	J	U		U		U		U	
EQ-3	6/4/2008	U		U		U		U		U		U		U		U		U		U		0.65	J	U		U		U		U	
EQ-4	6/5/2008	U		U		U		U		U		U		U		U		U		U		0.57	J	U		U		U		U	
EQ-1	9/8/2008	U		U		U		U		U		U		U		U		U		U		0.52		U		U		U		U	
EQ-2	9/9/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	9/10/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	9/11/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	12/9/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	12/10/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	12/11/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	12/12/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	5/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	5/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-5	5/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ1	6/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ2	6/29/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ3	6/30/2010	U		U		5.6		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ1	10/18/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ2	10/19/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ3	10/20/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
MW-EQ4	10/21/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	1/27/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	1/28/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	1/31/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	4/11/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	4/12/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	4/13/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	4/14/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	10/11/2011	U		U		U		U		U		U		U		U		U	L3	U		U		U		U		U		U	
EQ-2	10/12/2011	U		U		U		U		U		U		U		U		U	L3	U		U		U		U		U		U	
EQ-3	10/13/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	10/14/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	1/25/2012	**12**		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	1/26/2012	**12**		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	4/24/2012	U	N1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	4/25/2012	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	4/26/2012	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	4/27/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	10/9/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	10/10/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	10/11/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

		Detected Compounds using EPA Method 8260																													
	Parameter	Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
	Units	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	**NE**		**5^a**		**100^b**		**70**		**5^a**		**NE**		**700^a**				**NE**		**5^a**		**1000^a**		**5^a**		**NE**		**NE**		**10000^a**	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
EQ-1	1/22/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	1/23/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		1.9	
EQ-1	4/16/2013	U	R6	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	4/17/2013	U	R6	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	4/18/2013	U	R6	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	7/15/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	7/16/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	10/21/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	10/22/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-3	10/23/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-4	10/24/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-5	10/25/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-1	1/16/2014	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ-2	1/17/2014	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 1	4/7/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 2	4/9/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 3	4/11/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 4	4/15/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 1	7/16/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
EQ Blank 2	7/17/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20141210-2	12/10/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20141211-1	12/11/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20141212-1	12/12/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20150224	2/24/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20150225	2/25/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCEB-20150226	2/26/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/29/2005	U		U		U		U		U		U		U		U		U		U		0.69	J	U		U		U		U	
TRIP BLANK	5/23/2005	7.8	J	U		U		U		U		U		U		U		U	J4	U		U		U		U		U		U	
TRIP BLANK	5/27/2005	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	9/12/2005	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/19/2005	U		U		U		U		U		U		U		U		U	J3	U		U		U		U		U		U	
TRIP BLANK	3/30/2006	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/15/2006	U		U		U	J4	U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/20/2006	U		U		U	J4	U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/21/2006	U		U		U		U		U		U	J4	U		U		U		0.71	J	U		U		U		U		U	
TRIP BLANK	8/1/2006	U	J4	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	8/30/2006	U		U		U		U		U		U		U		U		U		U		0.51	J	U		U		U		U	
TRIP BLANK	8/31/2006	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/11/2006	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/11/2006	U		U		U		U		U		U		U		U		U	J3	U		U		U		U		U		U	
TRIP BLANK	12/12/2006	U		U		U		U		U		U		U		U		U	J3	U		U		U		U		U		U	
TRIP BLANK	12/15/2006	**19**	J	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/22/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/23/2007	U		U		U		U		U		U		U		U		1.7	J,J3	U		U		U		U		U		U	
TRIP BLANK	6/4/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/4/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/5/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	9/17/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	9/18/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	9/19/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/12/2007	**13**	J	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/11/2007	9.8	J	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/10/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/10/2007	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/21/2007	**12**	J	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/17/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/18/2008	**23**		0.58		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/19/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	3/20/2008	U		U		U		U		U		U		U		U		38		U		U		U		U		U		U	
TRIP BLANK	6/2/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/2/2008	17		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/3/2008	**18**		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/4/2008	U		U		U		U		U		U		U		U		U		U		0.65	J	U		U		U		U	
TRIP BLANK	6/5/2008	**14**		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	9/11/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	12/12/2008	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	6/28/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK 1	10/18/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK 2	10/20/2010	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

		Detected Compounds using EPA Method 8260																													
Parameter		Acetone		Benzene		Chloroform		cis-1,2-Dichloroethene		1,2-Dichloropropane		trans-1,3-Dichloropropene		Ethylbenzene		Methyl tert-butyl ether		Naphthalene		Tetrachloroethene		Toluene		Trichloroethene		1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		Xylenes, Total	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		**NE**		**5**^{a}		**100**^{b}		**70**		**5**^{a}		**NE**		**700**^{a}				**NE**		**5**^{a}		**1000**^{a}		**5**^{a}		**NE**		**NE**		**10000**^{a}	
Reported Detection Limit ESC (Prior to 9/08)		50.0		1.0		5.0		1.0		1.0		1.0		1.0		1.0		5.0		1.0		5.0		1.0		1.0		1.0		3.0	
Reported Detection Limit Test America (Post 9/08)		10.0		0.5		0.5		0.5		0.5		0.5		0.5		0.5		2.5		0.5		0.5		0.5		0.5		0.5		1.0	
Reported Detection Limit Test America (As of 1/11)		10		0.50		0.50		0.50		0.50		0.50		0.50		0.50		2.5		0.50		0.50		0.50		0.50		0.50		1.5	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TRIP BLANK	1/27/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/11/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/13/2011	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	10/10/2011	U		U		U		U		U		U		U		U		U	L3	U		U		U		U		U		U	
TRIP BLANK	1/24/2012	U	L3	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/24/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	10/9/2012	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	1/22/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	1/29/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/16/2013	U	R6	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	7/15/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	10/17/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK 2	10/21/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK 3	10/23/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK 4	10/24/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	10/31/2013	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	1/15/2014	U	V1	U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/7/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	4/14/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	7/15/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TRIP BLANK	7/17/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141210-1	12/10/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141210-2	12/10/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TB-20141210-3	12/10/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141211-1	12/11/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141211-2	12/11/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141212-1	12/12/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20141212-2	12/12/2014	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20150225	2/25/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
QCTB-20150226	2/26/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	
TB-20150227	2/27/2015	U		U		U		U		U		U		U		U		U		U		U		U		U		U		U	

Notes:

Additional analytes that have been detected but at concentrations below MCL/AWQS levels include bromodichloromethane, bromomethane, chlorodibromomethane, 2-butanone (MEK) and methyl chloride
U = Analyte not detected above laboratory's method detection limits
a = Arizona Aquifer Water Quality Standard
b = The MCL for the sum of trihalomethanes (bromoform, chloroform, bromodichloromethane, and chlorodibromomethane) is 100.
c = Duplicate sample
NA = Not applicable
NE = Not established
Bold Values Exceed MCL

Qualifiers:

D2 Sample required dilution due to high concentration of target analyte.
J5 The sample matrix interfered with the ability to make any accurate determination; spike value is high
J (EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J6 The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J8 The internal standard associated with this data responded abnormally low. The data is likely to show a high bias concerning the result.
J3 The associated batch QC was outside the established quality control range for precision.
J4 The associated batch QC was outside the established quality control range for accuracy.
L3 The associated blank spike recovery was above method acceptance limits.
L5 The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.
M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable.
N1 The MS-MSD RPD exceeded acceptance criteria for MTBE.
R6 The Laboratory Fortified Blank (LFB)/LFBD relative percent difference exceeded method control limit. Recovery met acceptance criteria.
V1 CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
B1 Target analyte detected in method blank at or above the method reporting limit.
E4 Concentration estimated; Analyte was detected below laboratory minimum reporting level, but above MDL.

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6***[a]		***10***[b]		***2000***[a]		***4***[a]		***5***[a]		***100***[a]		***1,300***[b,c]		***50***[b,d]		***2***[a]		[e]		***50***[a]		***100***[b]		***2***[a]		***5,000***[b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
EW-101	6/20/2006	NA		**14**	J	47		NA		<5.0		12		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	8/30/2006	<10		<20		45		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		500	
	12/12/2006	<10		**8.6**	J	47		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.23	J	<30	
	3/22/2007	NA		**18**	J	47		NA		<5.0		3.6	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	3/22/2007[f]	NA		**17.4**	J	47		NA		0.7	J	4.3	J	NA		<5.0		<0.20		NA		<20		<10	J6,J3			NA	
	6/4/2007	NA		**<20**		45		NA		1.3	J	<10		NA		2.4	J	<0.20		NA		<20		<10		NA		NA	
	9/19/2007	<1.0		**19**		45		NA		<5.0		<10		6.1	J	<5.0		<0.20		<20		<20		4.1	J	<1.0		19	J
	9/19/2007[f]	<1.0		**19**		44		NA		<5.0		<10		3.8	J	<5.0		<0.20		<20		<20		6	J	<1.0		22	J
	12/12/2007	<1.0		**18**		45		NA		<5.0		<10		3.5	J	<5.0		<0.20		<20		<20		<10		<1.0		17	
	12/12/2007[f]	<1.0		**18**		46		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		58	
	3/20/2008	<1.0		**19**		47		NA		0.9	J	<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		26	J
	6/5/2008	0.35	J	**16**		47		NA		2	J	2.4	J	<20		<5.0		<0.20		<20		<20		<10		<1.0		26	J
	9/11/2008	<3.0		**17**		48		<1.0		<1.0		<10		12		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/12/2008	<3.0		**18**		49		<1.0		<1.0		<10		15		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/21/2010	<2.0		**12.6**		57		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/15/2011	<40		<100		57		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/14/2011	<6.0	D1	**15**	D1	61	D1	<1.0		<2.0	D1	2.1	D1	4.7	D1	<2.0	D1	<0.20		5.0	D1	<4.0	D1	<2.0	D1	<2.0	D1	<20	D1
	4/27/2012	<3.0		**14**		50		<1.0		<1.0		1.5		21		<1.0		<0.20		2.3		2.1		<1.0		<1.0		13	
	10/11/2012	<3.0		**12**		53		<1.0		<1.0		2.0		6.5		<1.0		<0.20		2.7		<2.0		<1.0		<1.0		28	
	4/18/2013	<3.0		**12**		49		<0.20	D1	<1.0		1.1		6.7		<1.0		<0.20		3.1		<2.0		<1.0		<1.0		<10	
	10/25/2013	<3.0		**13**		51		<1.0		<1.0		3.0		5.1		<1.0		<0.20		2.9		<2.0		<1.0		<1.0		14	
	4/15/2014	<3.0		**13**		45		<1.0		<1.0		<2.0		5.5		<1.0		<0.20		3.2		<2.0		<1.0		<1.0		12	
MW-101	6/20/2006	NA		<20		44		NA		<5.0		5.3	J	NA		<5.0		<0.20		NA		14	J	<10		NA		NA	
	8/30/2006	<10		8	J	42		NA		<5.0		<10		29		<5.0		<0.20		<20		<20		<10		<1.0		54	
	12/12/2006	<10		**11**	J	NA		NA		<5.0		<10		18	J	<5.0		<0.20		<20		<20		<10		0.23	J	<30	
	3/21/2007	NA		**20**	J	44		NA		<5.0		3.6	J	NA		2.4	J	<0.20		NA		<20		<10		NA		NA	
	6/4/2007	NA		**<20**		50		NA		1.5	J	<10		NA		4.2	J	<0.20		NA		<20		<10		NA		NA	
	9/18/2007	0.55	J	**16**		42		NA		<5.0		<10		36		<5.0		<0.20		<20		<20		<10		0.23	J	<30	
	12/12/2007	<1.0		**17**		48		NA		<5.0		<10		34		<5.0		<0.20		<20		<20		<10		<1.0		23	
	3/19/2008	0.33	J	**18**		74		NA		1.5	J	<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	6/4/2008	0.75	J	**18**		48		NA		<5.0		<10		30		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/11/2008	<3.0		**18**		47		<1.0		<1.0		<10		38		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008	<3.0		**19**		50		<1.0		<1.0		<10		45		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/21/2010	<2.0		**15.3**		68		<2.0		<3.0		<10		41		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/14/2011	<40		<100		62		<1.0		<1.0		<10		33		<15		<0.20		<10		<100		<10		<100		<50	
	10/13/2011	<3.0		**18**		56		<1.0		<1.0		2.0		28		<1.0		<0.20		5.0		3.2		<1.0		<1.0		<10	
	10/13/2011[f]	<3.0		**18**		55		<1.0		<1.0		2.0		27		<1.0		<0.20		4.2		2.7		<1.0		<1.0		<10	
	4/27/2012	<3.0		**16**		48		<1.0		<1.0		2.1		24		<1.0		<0.20		2.4		2.2		<1.0		<1.0		<10	
	10/11/2012	<3.0		**14**		65		<1.0		<1.0		2.4		37		<1.0		<0.20		2.6		2.4		<1.0		<1.0		<10	
	4/18/2013	<3.0		**15**		53		<0.50	D1	<1.0		1.8		25		<1.0		<0.20		3.7		<2.0		<1.0		<1.0		<10	
	10/24/2013	<3.0		**16**		53		<1.0		<1.0		2.7		23		<1.0		<0.20		3.2		2.0		<1.0		<1.0		<10	
	4/15/2014	<3.0		**15**		46		<1.0		<1.0		3.0		22		<1.0		<0.20		3.7		2.0		<1.0		<1.0		<10	
	12/11/2014	<3.0		**17**	E4	53		<1.0		<1.0		1.9	E4	11		<1.0		<0.20		1.6	E4	<2.0		0.84	E4	<1.0		<10	
	2/24/2015	<3.0		**20**		49		<1.0		<1.0		<3.0		21		<1.0		<0.20		6.0		<2.0		<1.0		<1.0		<10	
MW-102	3/29/2005	**24**		**31**		NA		NA		<5.0		4	J	6.5	J	5.9		0.03	J	<20		22		<10		0.17	J	17	J
	5/23/2005	<10		<20		NA		NA		<5.0		<10		4.4	J	<5.0		<0.20		<20		<20		<10	J6	0.21	J	19	J
	5/23/2005[f]	<10		8.6	J	NA		NA		<5.0		<10		5.3	J	<5.0		<0.20		<20		<20		<10		0.21	J	150	
	9/12/2005	5.1	J	**13**	J	NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	12/19/2005	NA		**27**		52		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	3/30/2006	NA		<20		53		NA		<5.0		4.6	J	NA		<5.0		<0.20		NA		16	J	<10		NA		NA	
	6/21/2006	NA		**20**		50		NA		<5.0		<10		NA		<5.0		0.16	J	NA		34		<10		NA		NA	
	6/21/2006[f]	NA		<20		50		NA		<5.0		<10		NA		<5.0		0.06	J	NA		40		6.3	J			NA	
	8/30/2006	<10		<20		52		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		57	
	12/11/2006	<10		**7.9**	J	NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.22	J	<30	
	3/21/2007	NA		**18**	J	48		NA		<5.0		4.4	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/5/2007	NA		<20		52		NA		0.8	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/5/2007[f]	NA		<20		52		NA		1.9	J	<10		NA		<5.0		<0.20		NA		<20		<10				NA	
	9/18/2007	0.48	J	**16**		49		NA		<5.0		<10		3.5	J	3.6	J	<0.20		<20		<20		<10		0.21	J	<30	
	12/12/2007	<1.0		**18**		54		NA		<5.0		<10		<20		<5.0		<0.2		<20		<20		<10		<1.0		<30	
	3/20/2008	0.34	J	**18**		59		NA		1.0		<10		<20		<5.0		<0.2		<20		<20		<10		<1.0		<30	
	3/20/2008[f]	<1.0		**18**		59		NA		1.0	J	<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	6/5/2008	<1.0	J	**16**		58		NA		2.1	J	3.8	J	<20		<5.0		<0.2		13	J	7.1		<10		<1.0		<30	
	6/5/2008[f]	<1.0		**16**		60		NA		1.8	J	3.4	J	<20		<5.0		<0.20		11	J	<20		<10		<1.0		<30	
	9/10/2008	<3.0		**17**		54		<1.0		<1.0		<10		10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	9/10/2008[f]	<3.0		**17**		55		<1.0		<1.0		<10		11		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008	<3.0		**17**		56		<1.0		<1.0		<10		14		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/21/2010	<2.0		**14.5**		70		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/14/2011	<40		<100		69		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	4/14/2011[f]	<40		<100		62		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/14/2011	<3.0		**15**		54		<1.0		<1.0		2.4		2.9		<1.0		<0.20		3.2		2.4		<1.0		<1.0		<10	
	4/27/2012 122'-124'	<3.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<0.20		<1.0		<2.0		<1.0		<1.0		<10	
	10/12/2012 122'-124'	<3.0		<1.0		<1.0		<1.0		<1.0		<1.0		1.4		<1.0		<0.20		<1.0		<2.0		<1.0		<1.0		<10	
	4/19/2013 122'-124'	<3.0		<3.0		<1.0		<0.10		<1.0		<1.0	B7	<3.0		<1.0		<0.20		<1.0		<2.0		<1.0		<1.0		<10	
	12/11/2014	<3.0		**18**	E4	54		<1.0		<1.0		1.5	E4	<3.0		<1.0		<0.20		3.0	E4	<2.0		0.64	E4	<1.0		<10	
	2/24/2015	<3.0		**17**		55		<1.0		<1.0		3.3		6.5		<1.0		<0.20		5.7		<2.0		<1.0		<1.0		<10	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6***[a]		***10***[b]		***2000***[a]		***4***[a]		***5***[a]		***100***[a]		***1,300***[b,c]		***50***[b,d]		***2***[a]		[e]		***50***[a]		***100***[b]		***2***[a]		***5,000***[b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-103	3/29/2005	3.9	J	**12**	J	NA		NA		<5.0		3.2	J	6.7	J	5.7		0.03	J	5.1	J	14	J	<10		0.16	J	21	J
	3/29/2005[f]	5.1	J	**21**		NA		NA		<5.0		<10		4.6	J	<5.0		0.03	J	17	J	7.8	J	<10		<1.0		16	J
	5/23/2005	<10		<20		NA		NA		<5.0		<10		6.8	J	<5.0		<0.20		<20		<20		<10		0.21	J	22	J
	9/12/2005	<10		**24**		NA		NA		<5.0		3.4	J	<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/12/2005[f]	<10		**23**		NA		NA		<5.0		3.2	J	<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	12/19/2005	NA		**29**		41		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	3/30/2006	NA		8.4	J	51		NA		<5.0		3.1	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	3/30/2006[f]	NA		**17**	J	49		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		4.6	J			NA	
	6/21/2006	NA		<20		53		NA		<5.0		<10		NA		<5.0		0.075	J	NA		28		4.8	J	NA		NA	
	8/30/2006	<10		**10**	J	52		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.16	J	49	
	12/12/2006	<10		**11**	J	NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.21	J	<30	
	3/23/2007	NA		<20		83		NA		1.7	J	<10		NA		<5.0		<0.20		NA		<20		4.4	J	NA		NA	
	6/5/2007	NA		<20		62		NA		1.8	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	9/19/2007	<1.0		**18**		67		NA		<5.0		3.9	J	8.4	J	<5.0		<0.20		<20		<20		6.2	J	<1.0		<30	
	12/12/2007	<1.0		**16**		70		NA		<5.0		<10		<20		<5.0		<.20		<20		<20		<10		<1.0		<30	
	3/19/2008	0.33	J	**18**		74		NA		<5.0		<10		<20		<5.0		<.20		<20		<20		<10		<1.0		<30	
	6/4/2008	0.81	J	**17**		63		NA		<5.0		<10		<20		<5.0		<.20		<20		<20		<10		<1.0		<30	
	9/10/2008	<3.0		**16**		64		<1.0		<1.0		<10		10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/12/2008	<3.0		**18**		64		<1.0		<1.0		<10		15		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/12/2008[f]	<3.0		**17**		62		<1.0		<1.0		<10		19		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/21/2010	<2.0		**15.87**		78		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/14/2011	<40		<100		75		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/13/2011	<3.0		**19**		63		<1.0		<1.0		1.7		3.1		<1.0		<0.20		4.3		2.6		<1.0		<1.0		<10	
	4/27/2012	<3.0		**19**		56		<1.0		<1.0		2.2		6.5		<1.0		<0.20		1.8		2.0		<1.0		<1.0		<10	
	4/27/2012[f]	<3.0		**19**		64		<1.0		<1.0		2.2		6.4		<1.0		<0.20		1.8		2.1		<1.0		<1.0		<10	
	10/11/2012	<3.0		**15**		65		<1.0		<1.0		2.3		4.8		<1.0		<0.20		1.8		<2.0		<1.0		<1.0		<10	
	4/18/2013	<3.0		**16**		61		<0.50	D1	<1.0		1.2		5.6		<1.0		<0.20		3.4		<2.0		<1.0		<1.0		<10	
	10/24/2013	<3.0		**16**		69		<1.0		<1.0		4.3		3.7		<1.0		<0.20		3.2		<2.0		<1.0		<1.0		<10	
	4/15/2014	<3.0		**17**		63		<1.0		<1.0		2.0		5.1		<1.0		<0.20		3.4		<2.0		<1.0		<1.0		<10	
	12/11/2014	<3.0		**22**	E4	72		<1.0		<1.0		1.7	E4	3.0	E4	<1.0		<0.20		3.4	E4	<2.0		0.77	E4	<1.0		<10	
	2/24/2015	<3.0		**18**		71		<1.0		<1.0		<3.0		5.8		<1.0		<0.20		5.3		<2.0		<1.0		<1.0		<10	
MW-104S	3/28/2005	**10**		<20		NA		NA		<5.0		14		10	J			0.04	J	<20		<20		<10		0.18	J	26	J
	5/23/2005	<10		<20		NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.21	J	24	J
	9/12/2005	4.9	J	**10**	J	NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	12/19/2005	NA		**16**	J	87		NA		<5.0		3.8	J			<5.0		<0.20				<20		<10		NA			
	3/30/2006	NA		<20		99		NA		<5.0		<10				<5.0		<0.20				<20		<10		NA			
	6/20/2006	NA		8.9	J	99		NA		<5.0		4.4	J			<5.0		<0.20				32		<10		NA			
	8/31/2006	<10		<20		80		NA		<5.0		4	J	8	J	<5.0		<0.20		<20		<20		<10		<1.0		220	
	12/11/2006	<10		<20		NA		NA		1	J	<10		<20		<5.0		<0.20		<20		<20		<10		0.22	J	<30	
	3/22/2007			8.1	J	110		NA		<5.0		4	J			<5.0		<0.20						<10					
	6/4/2007			<20		110		NA		1.1	J	<10				<5.0		<0.20				16		<10					
	6/4/2007[f]	NA		<20		110		NA		1	J	<10		NA		4.4	J	<0.20		NA		<20		<10				NA	
	9/19/2007	<1.0		**14**		100		NA		<5.0		<10		5.6	J	3	J	<0.20		<10		<20		<10		<1.0		<30	
	12/12/2007	<1.0		**11**		94		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	3/19/2008	0.25	J	**14**		93		NA		1.5	J	2.6	J	<20		<5.0		<0.20		<20		<20		5.2	J	<1.0		<30	
	6/3/2008	0.9	J	**14**		85		NA		<5.0		2.2	J	8.8	J	3.5	J	<0.20		<20		<20		<10		<1.0		<30	
	9/10/2008	<3.0		**12**		92		<1.0		<1.0		<10		12		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008	<3.0		**17**		94		<1.0		<1.0		<10		15		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/19/2010	<2.0		8.13		72		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/12/2011	<40		<100		75		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/11/2011	<3.0		9.5		77		<1.0		<1.0		1.7		2.9		<1.0		<0.20		5.4		<2.0		<1.0		<1.0		<10	
	4/26/2012	<3.0		**10**		75		<1.0		<1.0		2.1		6.4		<1.0		<0.20		1.9		2.1		<1.0		<1.0		<10	
	4/26/2012[f]	<3.0		**11**		87		<1.0		<1.0		2.3		6.8		<1.0		<0.20		1.8		2.2		<1.0		<1.0		<10	
	10/11/2012	<3.0		**11**		98		<1.0		<1.0		2.4		5.3		<1.0		<0.20		1.9		2.8		<1.0		<1.0		<10	
	4/17/2013	<3.0		8.7		95		<0.20	D1	<1.0		1.4		5.9		<1.0		<0.20		3.3		3.1		<1.0		<1.0		<10	
	10/23/2013	<3.0		**13**		91		<1.0		<1.0		<4.0		<6.0		<1.0		<0.20		3.1		<4.0		<1.0		<2.0		<20	
	4/10/2014	<3.0		**10**		83		<1.0		<1.0		3.3		6.5		<1.0		<0.20		3.9		2.6		<1.0		<1.0		<10	
	12/11/2014	<3.0		**18**	E4	73		<1.0		<1.0		2.7	E4	<10		<1.0		<0.20		2.3	E4	<2.0		0.64	E4	<1.0		<10	
	2/26/2015	<3.0		**11**		68		<1.0		<1.0		<3.0		5.0		<1.0		<0.20		3.6		<2.0		<1.0		1.3	M2	<10	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6[a]***		***10[b]***		***2000[a]***		***4[a]***		***5[a]***		***100[a]***		***1,300[b,c]***		***50[b,d]***		***2[a]***		***[e]***		***50[a]***		***100[b]***		***2[a]***		***5,000[b]***	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-104D	3/28/2005	4.2	J	**16**	J	NA		NA		<5.0		13		5.8	J	<5.0		0.03	J	6.9	J	13	J	<10		0.17	J	180	
	5/27/2005	**23**		<20		NA		NA		<5.0		11		<20		<5.0		<0.20		<20		<20		<10		0.26	J	70	
	9/13/2005	4.2	J	<20		NA		NA		<5.0		12		4.1	J	<5.0		<0.20		<20		<20		<10		<1.0		72	
	12/19/2005	NA		7.6	J	58		NA		<5.0		12		NA		<5.0		<0.20		NA		<20		<10	J6	NA		NA	
	3/31/2006	NA		<20		65		NA		<5.0		11		NA		<5.0		<0.20		NA		7.8	J	<10		NA		NA	
	6/15/2006	NA		<20		75		NA		<5.0		11		NA		<5.0		0.052	J	NA		21		<10		NA		NA	
	8/1/2006	<10		<20		78		NA		<5.0		7.5	J	6.6	J	3.9	J	<0.20		<20		<20		<10		<1.0		140	
	12/15/2006	<10		**23**		NA		NA		<5.0		11		11	J	4	J	<0.20		<20		<20		3.4	J	<1.0		36	
	3/22/2007	NA		<20		71		NA		<5.0		12		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/6/2007	NA		<20		45		NA		<5.0		9.4	J	NA		<5.0		<0.2		NA		<20		2.6	J	NA		NA	
	9/19/2007	<1.0		6		55		NA		<5.0		11		170		13		<0.20		<20		<20		6.1	J	<1.0		190	
	12/21/2007	0.53	J	5.8		67		NA		<5.0		12		5.8	J	<5.0		0.05	J	<20		<20		<10	J6	0.3	J	58	
	3/19/2008	0.27	J	6.4		56		NA		1.7	J	10		86		9.8		<0.20		<20		<20		6.3	J	<1.0		100	
	6/3/2008	0.91	J	7.2		53		NA		<5.0	J	10		26		3.2	J	<0.20		<20		<20		<10		<1.0		80	
	9/8/2008	<3.0		5.3		53		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/10/2008	<3.0		5.5		51		<1.0		<1.0		<10		11		2.8		<0.20		<10		<2.0		<10		<1.0		<50	
	10/22/2010	<2.0		3.6		55		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		89	
	4/15/2011	<40		<100		49		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/14/2011	<3.0		5.6		51		<1.0		<1.0		10		3.5		<1.0		<0.20		2.9		<2.0		<1.0		<1.0		140	
	4/26/2012	<3.0		5.7		43		<1.0		<1.0		10		4.5		<1.0		<0.20		1.5		<2.0		<1.0		<1.0		120	
	10/12/2012	<3.0		5.0		45		<1.0		2.4		11		11		<1.0		<0.20		<1.0		<2.0		<1.0		<1.0		230	
	4/19/2013	<3.0		4.8		60		<0.10		<1.0		9.3		10		<1.0		<0.20		3.0		<2.0		<1.0		<1.0		170	
	10/17/2013	<3.0		5.2		62		<1.0		<1.0		9.1		4.0		6.0		<0.20		2.1		<2.0		<1.0		<1.0		120	
	4/8/2014	<3.0		4.2		57		<1.0		<1.0		10		5.1		1.3		<0.20		2.4		<2.0		<1.0		<1.0		32	
	12/11/2014	<3.0		6.4	E4	56		<1.0		<1.0		6.0	E4	<3.0		<1.0		<0.20		1.8	E4	<2.0		0.56	E4	<1.0		130	
	2/26/2015	<3.0		4.0		53		<1.0		<1.0		5.1		4.8		<1.0		<0.20		2.7		<2.0		<1.0		<1.0		170	
MW-105	6/21/2006	NA		**24**		47		NA		<5.0		<10		NA		<5.0		0.059	J	NA		**55**		<10		NA		NA	
	8/31/2006	<10		<20		45		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		22	J
	8/31/2006[f]	<10		<20		46		NA		<5.0		<10		4.3	J	<5.0		<0.20		<20		<20		<10		<1.0		28	J
	12/12/2006	<10		<20		NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.22	J	<30	
	12/12/2006[f]	<10		<20		NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.21	J	<30	
	3/23/2007	NA		<20		50		NA		1.4	J	<10		NA		<5.0		<0.20		NA		<20		3.8	J	NA		NA	
	6/5/2007	NA		<20		53		NA		1.5	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	9/18/2007	0.45	J	**14**		47		NA		<5.0		<10		<20		6.5		<0.20		<20		<20		<10		0.21	J	<30	
	9/18/2007[f]	0.51	J	**13**		48		NA		<5.0		<10		4.3	J	<5.0		<0.20		<20		<20		<10		0.22	J	<30	
	12/11/2007	0.38	J	**10**		47		NA		0.9	J	<10		<20		<5.0		<0.20		<20		14	J	<10		0.22	J	10	J
	3/19/2008	0.25	J	**18**		46		NA		1.8	J	2.6	J	<20		<5.0		<0.20		<20		<20		5.1	J	<1.0		<30	
	6/4/2008	0.85	J	**16**		50		NA		<2.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/9/2008	<3.0		**13**		57		<1.0		<1.0		<10		14		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008	<3.0		**14**		55		<1.0		<1.0		<10		16		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/20/2010	<2.0		**10.85**		66		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/11/2011	<40		<100		57		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	4/11/2011[f]	<40		<100		56		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/12/2011	<3.0		**12**		59		<1.0		<1.0		2.5		4.4		<1.0		<0.20		7.0		4.8		<1.0		<1.0		<10	
	4/26/2012	<3.0		**11**		57		<1.0		<1.0		2.6		7.7		<1.0		<0.20		1.8		3.3		<1.0		<1.0		<10	
	10/10/2012	<3.0		**11**		58		<1.0		<1.0		2.9		5.9		<1.0		<0.20		2.0		3.4		<1.0		<1.0		<10	
	4/16/2013	<3.0		7.8		55		<0.20	D1	<1.0		2.8		6.7		<1.0		<0.20		3.6		3.4		<1.0		<1.0		<10	
	10/21/2013	<3.0		9.9		57		<1.0		<1.0		<2.0		4.0		<1.0		<0.20		4.1		3.2		<1.0		<1.0		<10	
	4/7/2014	<3.0		9.8		52		<1.0		<1.0		4.1		6.6		<1.0		<0.20		3.7		2.6		<1.0		<1.0		<10	
	12/11/2014	<3.0		**16**	E4	46		<1.0		<1.0		2.2	E4	<3.0		<1.0		<0.20		<1.0		<2.0		0.54	E4	<1.0		<10	
	12/11/2014[f]	<3.0		**14**	E4	47		<1.0		<1.0		2.7	E4	<3.0		3.4	E4	<0.20		2.4	E4	<2.0		0.69	E4	<1.0		<10	
	2/24/2015	<3.0		**13**		46		<1.0		<1.0		<3.0		5.4		<1.0		<0.20		4.3		<2.0		<1.0		<1.0		<10	
	2/24/2015[f]	<3.0		**13**		45		<1.0		<1.0		3.0		5.3		<1.0		<0.20		3.8		<2.0		<1.0		<1.0		<10	
MW-106	12/11/2006	<10		<20		NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.23	J	<30	
	3/23/2007	NA		<20		66		NA		1.5	J	<10		NA		<5.0		<0.20		NA		<20		<10	J6,J3	NA		NA	
	6/4/2007	NA		<20		64		NA		0.9	J	<10		NA		2.8	J	<0.20		NA		<20		<10		NA		NA	
	9/18/2007	0.45	J	**10**		52		NA		<5.0		2.3	J	4.6	J	2.8	J	<0.20		<20		<20		3.3	J	0.2	J	<30	
	12/11/2007	0.36	J	**12**		54		NA		<5.0		3.4	J	6.8	J	<5.0		<0.20		<20		25		<10		0.17	J	<30	
	3/18/2008	0.39	J	**14**		48		NA		1.2	J	2.3	J	<20		<5.0		<0.20		<20		<20		3.4	J	<1.0		<30	
	3/18/2008[f]	<1.0		**12**		51		NA		<5.0		<10		<20		<5.0		<0.20		<20		24		<10		<1.0		18	J
	6/4/2008	0.78	J	**12**		52		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	6/4/2008[f]	1		**12**		52		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/9/2008	<3.0		**11**		60		<1.0		<1.0		<10		<1.0		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	9/9/2008[f]	<3.0		**11**		58		<1.0		<1.0		<10		13		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008	<3.0		**11**		57		<1.0		<1.0		<10		16		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/11/2008[f]	<3.0		**12**		58		<1.0		<1.0		<10		16		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/20/2010	<2.0		9.13		58		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/14/2011	<40		<100		51		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/12/2011	<3.0		**11**		56		<1.0		<1.0		2.6		4.6		<1.0		<0.20		10		4.6		<1.0		<1.0		<10	
	10/12/2011[f]	<3.0		**11**		56		<1.0		<1.0		2.5		4.6		<1.0		<0.20		9.9		4.3		<1.0		<1.0		<10	
	4/26/2012	<3.0		**10**		54		<1.0		<1.0		2.4		7.2		<1.0		<0.20		1.9		2.9		<1.0		<1.0		<10	
	10/11/2012	<3.0		9.7		57		<1.0		<1.0		2.5		5.1		<1.0		<0.20		2.0		2.8		<1.0		<1.0		<10	
	10/11/2012[f]	<3.0		9.9		58		<1.0		<1.0		2.1		4.5		<1.0		<0.20		2.0		2.7		<1.0		<1.0		<10	
	4/17/2013	<3.0		8.3		48		<0.20	D1	<1.0		1.2		5.5		<1.0		<0.20		2.9		2.4		<1.0		<1.0		<10	
	10/23/2013	<3.0		**10**		45		<1.0		<1.0		2.5		3.2		<1.0		<0.20		3.9		<2.0		<1.0		<1.0		<10	
	4/15/2014	<3.0		**10**		40		<1.0		<1.0		2.1		5.2		<1.0		<0.20		4.0		<2.0		<1.0		<1.0		<10	
	12/10/2014	<3.0		**18**	E4	43		<1.0		<1.0		<3.0		<3.0		<1.0		<0.20		1.5	E4	<2.0		0.56	E4	<1.0		<10	
	2/24/2015	<3.0		**12**		44		<1.0		<1.0		<3.0		6.6		<1.0		<0.20		5.5		<2.0		<1.0		<1.0		<10	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
MCL/AWQS:		***6*** [a]		***10*** [b]		***2000*** [a]		***4*** [a]		***5*** [a]		***100*** [a]		***1,300*** [b,c]		***50*** [b,d]		***2*** [a]		[e]		***50*** [a]		***100*** [b]		***2*** [a]		***5,000*** [b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-107	6/6/2007	NA		**11**	J	67		NA		<5.0		2.4	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	9/17/2007	0.48	J	9.7		58		NA		<5.0		<10		<20		<5.0		0.06	J	<20		<20		<10		0.22	J	<30	
	12/10/2007	<1.0		**14**		58		NA		0.8	J	<10		4.1	J	<5.0		0.07	J	<20		<20		<10		<1.0		<30	
	3/17/2008	<1.0		**14**		53		NA		1.1	J	2.3	J	<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	6/2/2008	<1.0		**11**		52		NA		<2.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/9/2008	<3.0		**11**		55		<1.0		<1.0		<10		13		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/9/2008	<3.0		**10**		55		<1.0		<1.0		<10		16		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/18/2010	<2.0		6.03		46		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/11/2011	<40		<100		50		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/10/2011	<3.0		9.5		52		<1.0		<1.0		2.8		3.4		<1.0		<0.40	D1	3.9		2.8		<1.0		<1.0		<10	
	4/24/2012	<3.0		9.4		51		<1.0		<1.0		3.1		7.1		<1.0		<0.20		1.7		2.9		<1.0		<1.0		<10	
	10/9/2012	<3.0		9.2		56		<1.0		<1.0		2.9		5.4		<1.0		<0.20		1.9		3.2		<1.0		<1.0		<10	
	4/16/2013	<3.0		6.4		54		<0.20	D1	<1.0		3.3		5.8		<1.0		<0.20		3.7		3.5		<1.0		<1.0		<10	
	10/21/2013	<3.0		8.2		56		<1.0		<1.0		2.3		3.9		<1.0		<0.20		4.7		3.5		<1.0		<1.0		<10	
	4/7/2014	<3.0		8.2		53		<1.0		<1.0		6.4		8.3		<1.0		<0.20		4.2		3.3		<1.0		<1.0		<10	
	12/11/2014	<3.0		**11**	E4	51		<1.0		<1.0		3.0	E4	3.1	E4	<1.0		<0.20		1.5	E4	<2.0		0.81	E4	<1.0		<10	
	2/25/2015	<3.0		9.8		49		<1.0		<1.0		<3.0		6.7		<1.0		<0.20		4.0		4.1		<1.0		<1.0		<10	
MW-108	6/7/2007	NA		<20		71		NA		<5.0		3.8	J	NA		<5.0		<0.20		<20		<20		<10		NA		NA	
	9/17/2007	0.63	J	7.1		57		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		0.23	J	<30	
	12/10/2007	<1.0		**11**		50		NA		0.7	J	<10		<20		<5.0		0.07	J	<20		<20		<10		<1.0		<30	
	3/18/2008	<1.0	J	8.2		50		NA		1.4	J	3	J	<20		<5.0		<0.20		<20		<20		<10	J	<1.0		<30	
	6/3/2008	0.91	J	9.8		47		NA		<5.0	J	3.1	J	8.3	J	2.4	J	<0.20		<20		<20		<10	J	<1.0		<30	
	9/9/2008	<3.0		7.8		49		<1.0		<1.0		<10		11		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/10/2008	<3.0		8.4		50		<1.0		<1.0		<10		13		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/20/2010	<2.0		8.36		49		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/13/2011	<40		<100		46		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/13/2011	<3.0		8.1		48		<1.0		<1.0		1.9		3.3		<1.0		<0.20		4.9		2.1		<1.0		<1.0		<10	
	4/25/2012	<3.0		8.1		46		<1.0		<1.0		2.1		6.2		<1.0		<0.20		1.7		<2.0		<1.0		<1.0		<10	
	10/10/2012	<3.0		8.6		55		<1.0		<1.0		2.4		6.4		<1.0		<0.20		1.7		2.5		<1.0		<1.0		<10	
	4/17/2013	<3.0		6.2		48		<0.20	D1	<1.0		3.4		5.4		<1.0		<0.20		3.6		2.7		<1.0		<1.0		<10	
	10/23/2013	<3.0		9.0		46		<1.0		<1.0		3.4		3.3		<1.0		<0.20		3.9		2.2		<1.0		<1.0		<10	
	4/11/2014	<3.0		8.1		42		<1.0		<1.0		3.2		6.8		<1.0		<0.20		2.9		<2.0		<1.0		<1.0		<10	
	12/12/2014	<3.0		**16**	E4	40		<1.0		<1.0		2.5	E4	<3.0		<1.0		<0.20		1.9	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		**10**		41		<1.0		<1.0		<3.0		5.0		<1.0		<0.20		3.7		<2.0		<1.0		<1.0		<10	
MW-109	6/7/2007	NA		<20		84		NA		<5.0		4.5	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	9/17/2007	0.46	J	<20		66		NA		2.4	J	2.6	J	4.1	J	<5.0		<0.20		<20		<20		<10		0.22	J	<30	
	12/10/2007	0.26	J	11		59		NA		0.7	J	<10		<20		<5.0		0.07	J	<20		<20		<10		<1.0		<30	
	3/18/2008	<1.0		**11**		58		NA		1.4	J	3.3	J	<20		<5.0		<0.20		<20		<20		3.5	J	<1.0		<30	
	6/3/2008	1.4		**10**		55		NA		<5.0		2.3	J	7.2	J	<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/9/2008	<3.0		9.4		64		<1.0		<1.0		<10		14		<1.0		<0.20		<10		2.2		<10		<1.0		<50	
	12/10/2008	<3.0		9.6		67		<1.0		<1.0		<10		18		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/19/2010	<2.0		5.96		48		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		3.81		<5.0		<0.50		<50	
	4/13/2011	<40		<100		49		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/12/2011	<3.0		**10**	D1	54		<1.0		<1.0		2.6	D1	4.9	D1	<1.0		0.27		7.6	D1	6.1	D1	<1.0		<1.0		<20	D1
	4/25/2012	<3.0		9.5		50		<1.0		<1.0		2.5		7.4		<1.0		<0.20		1.8		4.4		<1.0		<1.0		<10	
	10/10/2012	<3.0		9.4		50		<1.0		<1.0		2.3		5.6		<1.0		<0.20		1.8		3.7		<1.0		<1.0		<10	
	4/17/2013	<3.0		6.7		45		<0.20	D1	<1.0		2.6		5.7		<1.0		<0.20		3.5		3.7		<1.0		<1.0		<10	
	10/23/2013	<3.0		8.1		47		<1.0		<1.0		3.1		3.3		<1.0		<0.20		4.2		3.3		<1.0		<1.0		<10	
	4/11/2014	<3.0		8.4		45		<1.0		<1.0		3.4		5.8		<1.0		<0.20		3.5		3.0		<1.0		<1.0		<10	
	12/12/2014	<3.0		**13**	E4	46		<1.0		<1.0		2.7	E4	3.1	E4	3.8	E4	<0.20		1.6	E4	<2.0		0.56	E4	<1.0		<10	
	2/25/2015	<3.0		8.7		46		<1.0		<1.0		3.7		5.5		<1.0		<0.20		4.3		3.2		<1.0		<1.0		11	
MW-110	3/18/2008	<1.0		**10**		48		NA		1.4	J	<10		<20		<5.0		<0.20		<20		<20		7.4	J	<1.0		<30	
	6/3/2008	0.96	J	**15**		47		NA		<5.0		2.1	J	8.6	J	15		<0.20		9.8	J	<20		<10		<1.0			
	9/8/2008	<3.0		8.7		61		<1.0		<1.0		<10		15		<1.0		<0.20		<10		3.5		<10		<1.0		<50	
	12/10/2008	<3.0		8.9		55		<1.0		<1.0		<10		18		<1.0		<0.20		<10		2.1		<10		<1.0		<50	
	10/19/2010	<2.0		7.43		44		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/13/2011	<40		<100		47		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/13/2011	<6.0		**11**	D1	58	D1	<1.0		<2.0	D1	2.5	D1	4.2	D1	<2.0	D1	<0.20		6.6	D1	5.5	D1	<2.0	D1	<2.0	D1	<20	D1
	4/25/2012	<3.0		8.8		49		<1.0		<1.0		2.3		7.1		<1.0		<0.20		2.0		4.7		<1.0	M2	<1.0		<10	
	10/11/2012	<3.0		9.2		46		<1.0		<1.0		2.3		5.0		<1.0		<0.20		2.0		3.0		<1.0		<1.0		<10	
	4/16/2013	<3.0		7.0		44		<0.20	D1	<1.0		5.3		5.4		<1.0		<0.20		4.0		3.5		<1.0		<1.0		<10	
	10/22/2013	<3.0		7.3	D1	49		<1.0		<1.0		<4.0	D1	<6.0	D1	<1.0		<0.20		3.9	D1	<4.0	D1	<1.0		<1.0		<20	D1
	4/9/2014	<3.0		7.5		44		<1.0		<1.0		2.6		5.8		<1.0		<0.20		3.6		3.1		<1.0		<1.0		<10	
	12/12/2014	<3.0		**13**	E4	43		<1.0		<1.0		3.0		<3.0		<1.0		<0.20		2.1	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		8.8		43		<1.0		<1.0		3.6		5.6		<1.0		<0.20		4.6		4.0		<1.0		<1.0		<10	
MW-111	3/17/2008	<1.0		0.16	J	53		NA		1.5	J	4.3	J	<20		<5.0		<0.20		<20		<20		<10		0.1	J	<30	
	6/2/2008	<1.0		9.9		47		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
	9/8/2008	<3.0		**11**		49		<1.0		<1.0		<10		11		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/9/2008	<3.0		**11**		49		<1.0		<1.0		<10		15		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/18/2010	<2.0		6.95		47		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/12/2011	<40		<100		47		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/10/2011	<3.0		9.9		52		<1.0		<1.0		2.4		3.5		<1.0		<0.40	D1	4.9		<2.0		<1.0		<1.0		<10	
	4/24/2012	<3.0		**10**		50		<1.0		<1.0		2.6		6.6		<1.0		<0.20		1.8		2.3		<1.0		<1.0		<10	
	10/9/2012	<3.0		**10**		51		<1.0		<1.0		2.9		5.1		<1.0		<0.20		1.9		2.3		<1.0		<1.0		<10	
	4/16/2013	<3.0		7.9		48		<0.20	D1	<1.0		1.5		5.1		<1.0		<0.20		2.8		2.7		<1.0		<1.0		<10	
	10/22/2013	<3.0		8.6		48		<1.0		<1.0		2.4		3.4		<1.0		<0.20		4.6		2.7		<1.0		<1.0		<10	
	4/7/2014	<3.0		9.0		48		<1.0		<1.0		4.1		6.2		<1.0		<0.20		3.7		2.9		<1.0		<1.0		<10	
	12/10/2014	<3.0		**15**	E4	47		<1.0		<1.0		3.1	E4	<10		<1.0		<0.20		1.1	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		9.0		48		<1.0		<1.0		4.3		5.4		<1.0		<0.20		4.3		4.3		<1.0		<1.0		<10	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6***[a]		***10***[b]		***2000***[a]		***4***[a]		***5***[a]		***100***[a]		***1,300***[b,c]		***50***[b,d]		***2***[a]		[e]		***50***[a]		***100***[b]		***2***[a]		***5,000***[b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-112	3/17/2008	<1.0		**13**		63		NA		0.9	J	2.6	J	<20		<5.0		<0.2		<20		<20		<10		<1.0		<30	
	6/2/2008	<1.0		**13**		54		NA		<5.0		<10		<20		<5.0		<0.2		<20		<20		19		<1.0		<30	
	9/8/2008	<3.0		**17**		86		<1.0		<1.0		<10		13		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/9/2008	<3.0		**17**		91		<1.0		<1.0		<10		19		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/18/2010	<2.0		**10.2**		76		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		<50	
	4/12/2011	<40		<100		73		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		<50	
	10/11/2011	<3.0		**12**		75		<1.0		<1.0		3.1		4.1		<1.0		<0.20		3.3		2.9		<1.0		<1.0		<10	
	4/25/2012	<3.0		**11**		69		<1.0		<1.0		3.5		7.9		<1.0		<0.20		1.2		2.7		<1.0		<1.0		<10	
	10/9/2012	<3.0		**12**		72		<1.0		<1.0		3.2		4.6		<1.0		<0.20		1.2		3.1		<1.0		<1.0		<10	
	4/16/2013	<3.0		**10**		70		<0.20	D1	<1.0		2.4		6.4		<1.0		<0.20		2.7		3.8		<1.0		<1.0		<10	
	10/22/2013	<3.0		**12**		70		<1.0		<1.0		2.7		3.9		<1.0		<0.20		4.2		3.4		<1.0		<1.0		<10	
	4/9/2014	<3.0		**11**		67		<1.0		<1.0		3.5		5.8		<1.0		<0.20		2.9		3.3		<1.0		<1.0		<10	
	12/10/2014	<3.0		**18**	E4	67		<1.0		<1.0		2.2	E4	<10		<1.0		<0.20		<10		<2.0		<1.0		<1.0		<10	
	12/10/2014[f]	<3.0		**17**	E4	67		<1.0		<1.0		2.6	E4	<10		<1.0		<0.20		<10		<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		**13**		69		<1.0		<1.0		3.9		6.0		<1.0		<0.20		3.6		4.8		<1.0		<1.0		<10	
MW-113	10/11/2011	<3.0		9.4		28		<1.0		<1.0		2.2		4.3		<1.0		<0.20		6.4		5.6		<1.0		<1.0		<10	
	4/24/2012	<3.0		**10**		29		<1.0		<1.0		2.8		9.4		<1.0		<0.20		2.1		6.2		<1.0		<1.0		<10	
	10/9/2012	<3.0		**12**		28		<1.0		<1.0		2.5		6.1		<1.0		<0.20		2.2		3.6		<1.0		<1.0		<10	
	4/17/2013	<3.0		9.2		27		<0.20	D1	<1.0		1.6		6.8		<1.0		<0.20		3.4		3.9		<1.0		<1.0		<10	
	10/21/2013	<3.0		**12**		31		<1.0		<1.0		2.5		4.0		<1.0		<0.20		4.5		2.4		<1.0		<1.0		<10	
	4/8/2014	<3.0		**11**		32		<1.0		<1.0		3.1		7.0		<1.0		<0.20		3.5		2.8		<1.0		<1.0		<10	
	12/10/2014	<3.0		**17**	E4	34		<1.0		<1.0		2.2	E4	<10		<1.0		<0.20		1.5	E4	<2.0		0.57	E4	<1.0		<10	
	2/25/2015	<3.0		**10**		38		<1.0		<1.0		3.7		4.9		<1.0		<0.20		5.1		4.8		<1.0		<1.0		<10	
MW-114	10/11/2011	<3.0		8.7		77		<1.0		<1.0		2.3		2.9		<1.0		<0.20		4.4		<2.0		<1.0		<1.0		<10	
	4/24/2012	<3.0		9.7		74		<1.0		<1.0		2.2		6.0		<1.0		<0.20		1.9		<2.0		<1.0		<1.0		<10	
	10/9/2012	<3.0		9.5		66		<1.0		<1.0		2.2		4.2		<1.0		<0.20		1.6		<2.0		<1.0		<1.0		<10	
	10/9/2012[f]	<3.0		9.6		66		<1.0		<1.0		2.2		4.1		<1.0		<0.20		1.8		<2.0		<1.0		<1.0		<10	
	4/17/2013	<3.0		7.0		57		<0.20	D1	<1.0		5.8		5.2		<1.0		<0.20		4.2		3.1		<1.0		<1.0		<10	
	4/17/2013[f]	<3.0		6.8		56		<0.20	D1	<1.0		1.7		5.1		<1.0		<0.20		3.0		2.8		<1.0		<1.0		<10	
	10/22/2013	<3.0		8.7		56		<1.0		<1.0		2.6		3.6		<1.0		<0.20		4.9		2.8		<1.0		<1.0		<10	
	4/8/2014	<3.0		8.1		54		<1.0		<1.0		3.2		5.5		<1.0		<0.20		3.7		2.7		<1.0		<1.0		<10	
	12/10/2014	5.5	E4	**17**	E4	52		<1.0		<1.0		3.1	E4	<10		<1.0		<0.20		2.8	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		8.3		60		<1.0		<1.0		4.2		6.7		<1.0		<0.20		4.6		3.7		<1.0		<1.0		<10	
MW-115	10/25/2013	<3.0		7.0		65		<1.0		<1.0		4.0		4.4		<1.0		<0.20		8.4		<2.0		<1.0		<1.0		<10	
	4/11/2014	<3.0		**10**		44		<1.0		<1.0		<2.0		5.7		<1.0		<0.20		4.0		<2.0		<1.0		<1.0		<10	
	12/10/2014	<3.0		**15**	E4	45		<1.0		<1.0		<2.0		<10		<1.0		<0.20		2.5	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		**11**		46		<1.0		<1.0		<2.0		5.5		<1.0		<0.20		5.0		<2.0		<1.0		<1.0		<10	
MW-116	10/25/2013	<3.0		8.8		44		<1.0		<1.0		4.6		4.1		<1.0		<0.20		3.9		3.1		<1.0		<1.0		<10	
	10/25/2013[f]	<3.0		8.2		44		<1.0		<1.0		6.0		3.8		<1.0		<0.20		4.2		3.2		<1.0		<1.0		<10	
	4/14/2014	<3.0		9.8		43		<1.0		<1.0		2.5		5.2		<1.0		<0.20		3.6		2.5		<1.0		<1.0		<10	
	4/14/2014[f]	<3.0		9.7		43		<1.0		<1.0		2.6		4.9		<1.0		<0.20		3.6		2.5		<1.0		<1.0		<10	
	12/10/2014	<3.0		**16**	E4	40		<1.0		<1.0		<10		<10		<1.0		<0.20		3.0	E4	<2.0		<1.0		<1.0		<10	
	2/26/2015	<3.0		**11**		40		<1.0		<1.0		<10		4.9		<1.0		<0.20		3.8		<2.0		<1.0		<1.0		<10	
	2/26/2015[f]	<3.0		**11**		39		<1.0		<1.0		<10		5.0		<1.0		<0.20		4.5		<2.0		<1.0		<1.0		<10	
MW-117	10/25/2013	<3.0		**14**		46		<1.0		<1.0		3.3		4.9		<1.0		<0.20		4.6		<2.0		<1.0		<1.0		<10	
	4/11/2014	<3.0		**14**		44		<1.0		<1.0		5.6		6.4		<1.0		<0.20		5.8		<2.0		<1.0		<1.0		<10	
	4/11/2014[c]	<3.0		**14**		43		<1.0		<1.0		2.5		6.0		<1.0		<0.20		4.4		<2.0		<1.0		<1.0		<10	
	12/10/2014	<3.0		**19**	E4	43		<1.0		<1.0		1.6	E4	<10		<1.0		<0.20		2.4	E4	<2.0		<1.0		<1.0		<10	
	2/24/2015	<3.0		**15**		45		<1.0		<1.0		<3.0		6.3		<1.0		<0.20		5.7		<2.0		<1.0		<1.0		<10	
MW-118	10/25/2013	<3.0		**13**		44		<1.0		<1.0		3.9		5.6		<1.0		<0.20		6.5		<2.0		<1.0		<1.0		<10	
	10/25/2013[c]	<3.0		**14**		44		<1.0		<1.0		2.3		5.5		<1.0		<0.20		5.9		<2.0		<1.0		<1.0		<10	
	4/14/2014	<3.0		**12**		40		<1.0		<1.0		<2.0		6.4		<1.0		<0.20		4.8		<2.0		<1.0		<1.0		<10	
	12/10/2014	<3.0		**18**	E4	50		<1.0		<1.0		2.1	E4	4.1	E4	<1.0		<0.20		8.8	E4	<2.0		<1.0		<1.0		<10	
	2/25/2015	<3.0		**14**		44		<1.0		<1.0		<2.0		7.0		<1.0		<0.20		5.4		<2.0		<1.0		<1.0		<10	
MW-119S	10/24/2013	<3.0		**13**		50		<1.0		<1.0		2.6		4.4		<1.0		<0.20		4.0		<2.0		<1.0		<1.0		<10	
	4/14/2014	<3.0		**14**		40		<1.0		<1.0		<2.0		5.9		<1.0		<0.20		3.8		<2.0		<1.0		<1.0		<10	
	12/10/2014	<3.0		**17**	E4	46		<1.0		<1.0		<2.0		3.6	E4	<1.0		<0.20		2.5	E4	<2.0		0.71	E4	<1.0		<10	
	2/25/2015	<3.0		**15**		45		<1.0		<1.0		<2.0		7.4		<1.0		<0.20		5.0		<2.0		<1.0		<1.0		<10	
MW-119D	10/18/2013	<3.0		6.0		150		<1.0		<1.0		33		11		11		<0.20		8.9		2.1		<1.0		<1.0		250	
	4/9/2014	<3.0		3.9		70		<1.0		<1.0		6.2		6.2		1.4		<0.20		3.9		<2.0		<1.0		<1.0		34	
	12/11/2014	**7.2**	E4	**16**	E4	72		<1.0		<1.0		6.8	E4	5.8	E4	<1.0		<0.20		3.4	E4	10	E4	0.92	E4	<1.0		330	
	2/26/2015	<3.0		4.5		57		<1.0		<1.0		5.6		4.5		<1.0		<0.20		3.4		<2.0		<1.0		<1.0		53	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	6^a		10^b		2000^a		4^a		5^a		100^a		$1{,}300^{b,c}$		$50^{b,d}$		2^a		^{e}		50^a		100^b		2^a		$5{,}000^b$	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-G7	3/28/2005	<10		**26**		NA		NA		<5.0		4.2	J	13	J	5.6		0.03	J	8.6	J	<20		<10		0.17	J	41	
	5/23/2005	<10		8.2	J	NA		NA		<5.0		<10		68		5	J	<0.20		<20		<20		<10		0.22	J	81	
	9/13/2005	<10		**19**	J	NA		NA		<5.0		<10		7.2	J	<5.0		<0.20		<20		<20		<10		<1.0		16	J
	12/19/2005	NA		**30**		52		NA		<5.0		<10		NA		<5.0		<0.20		NA		7.8	J	<10		NA			
	3/30/2006	NA		**20**		49		NA		<5.0		<10		NA		<5.0		<0.20		NA		14	J	<10		NA			
	6/20/2006	NA		8.4	J	50		NA		<5.0		<10		NA		<5.0		<0.20		NA		32		<10		NA			
	8/31/2006	<10		8.7	J	54		NA		<5.0		<10		18	J	<5.0		<0.20		<20		<20		<10		0.19	J	37	
	12/11/2006	<10		**33**		NA		NA		2.2	J	6.9	J	22		<5.0		<0.20		<20		<20		<10		0.22	J	49	
	3/22/2007	NA		**24**		50		NA		<5.0		2.7	J	NA		3.3	J	<0.20		NA		<20		<10		NA			
	6/4/2007	NA		<20		55		NA		2.1	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA			
	9/17/2007	0.66	J	**21**		57		NA		<5.0		<10		17	J	<5.0		<0.20		<20		<20		4	J	0.21	J	33	
	12/10/2007	<1.0		**27**		54		NA		1.5	J	<10		6.7	J	<5.0		0.07	J	<20		<20		<10		<1.0		18	J
	3/18/2008	<1.0		**29**		56		NA		1.7	J	2.8	J	9	J	3.4	J	<0.20		<20		<20		4.5	J	<1.0		120	
	6/2/2008	<1.0		**60**		66		NA		2.1	J	6.9	J	27		2.2	J	<0.20		<20		<20		<10		<1.0		260	
	9/10/2008	<3.0		**26**		57		<1.0		<1.0		<10		24		1.7		<0.20		<10		<2.0		<10		<1.0		150	
	12/9/2008	<3.0		**25**		59		<1.0		1.1		<10		<10		2.0		<0.20		<10		<2.0		<10		<1.0		160	
	10/19/2010	<2.0		**16.9**		58		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		57	
	4/12/2011	<40		<100		64		<1.0		<1.0		<10		16		<15		<0.20		<10		<100		<10		<100		63	
	10/13/2011	<3.0		**24**		72		<1.0		<1.0		2.9		4.8		<1.0		<0.20		4.0		2.6		<1.0		<1.0		52	
	4/24/2012	<3.0		**19**		76		<1.0		<1.0		2.8		11		1.1		<0.20		2.3		2.4		<1.0		<1.0		31	
	10/10/2012	<3.0		**22**		72		<1.0		<1.0		2.8		7.7		<1.0		<0.20		2.0		2.0		<1.0		<1.0		44	
	4/18/2013	<3.0		**20**		63		<0.20	D1	<1.0		3.0		9.3		<1.0		<0.20		2.9		2.5		<1.0		<1.0		37	
	10/23/2013	<3.0	D1	**23**	D1	65	D1	<1.0		<2.0	D1	5.7	D1	19	D1	1.4		<0.20		3.8	D1	<4.0	D1	<2.0	D1	<2.0	D1	120	D1
	4/10/2014	<3.0		**18**		58		<1.0		<1.0		3.0		8.0		<1.0		<0.20		4.2		<2.0		<1.0		<1.0		28	
	12/10/2014	<3.0		**26**	E4, H6	56	H6	<1.0		<1.0		<10		7.4	E4, H6	<1.0		<0.20		2.2	E4, H6	<2.0		<1.0		<1.0		29	E4, H6
	12/10/2014 [f]	<3.0		**23**	E4, H6	56	H6	<1.0		<1.0		<10		5.0	E4, H6	<1.0		<0.20		1.9	E4, H6	<2.0		<1.0		<1.0		27	E4, H6
	2/27/2015	<3.0		**18**	H6	55	H6	<1.0		<1.0		<10		8.1	H6	<1.0		<0.20		5.9	H6	<2.0		<1.0		<1.0		28	H6
TOG-G8	3/28/2005	**9**	J	**21**		NA		NA		<5.0		<10		82		7.7		0.04	J	12	J	<20		<10		0.15	J	110	
	5/23/2005	<10		**15**	J	NA		NA		<5.0		<10		31		8.9		<0.20		<20		<20		<10		0.23	J	84	
	9/13/2005	<10		**13**	J	NA		NA		<5.0		<10		16	J	<5.0		<0.20		<20		<20		18		<1.0		35	
	12/19/2005	NA		**25**		64		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	3/30/2006	NA		**11**	J	62		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/20/2006	NA		**11**	J	64		NA		<5.0		3.4	J	NA		<5.0		<0.20		NA		8.2	J	<10		NA		NA	
	8/31/2006	<10		8.8	J	66		NA		<5.0		<10		8.6	J	<5.0		<0.20		<20		<20		<10		<1.0		110	
	12/11/2006	<10		**15**	J	NA		NA		1	J	<10		<20		<5.0		<0.20		<20		<20		<10		0.25	J	88	
	3/22/2007	NA		**25**		66		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/4/2007	NA		**17**	J	68		NA		1.5	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	9/17/2007	0.49	J	**20**		63		NA		<5.0		2.7	J	11	J	<5.0		<0.20		<20		<20		<10		0.25	J	85	
	12/10/2007	<1.0		**27**		61		NA		1.6	J	<10		<20		<5.0		0.07	J	<20		<20		<10		<1.0		110	
	3/18/2008	0.23	J	**29**		62		NA		1.6	J	<10		<20		<5.0		<0.20		<20		<20		3.3	J	<1.0		89	
	6/2/2008	<1.0		**27**		67		NA		1.6	J	<10		6.8	J	<5.0		<0.20		<20		7.9	J	<10		<1.0		90	
	9/10/2008	<3.0		**29**		68		<1.0		<1.0		<10		12		<1.0		<0.20		<10		<2.0		<10		<1.0		620	
	12/9/2008	<3.0		**30**		73		<1.0		1.2		<10		<10		1.7		<0.20		<10		<2.0		<10		<1.0		250	
	10/19/2010	<2.0		**24.1**		80		<2.0		<3.0		<10		<10		<2.0		<0.20		<10		<2.0		<5.0		<0.50		171	
	4/12/2011	<40		<100		89		<1.0		<1.0		<10		<10		<15		<0.20		<10		<100		<10		<100		130	
	10/13/2011	<6.0	D1	**38**	D1	110	D1	<1.0		<2.0	D1	5.1	D1	6.3	D1	1.4		<0.20		4.7	D1	<4.0	D1	<2.0	D1	<1.0		130	D1
	4/24/2012	<3.0		**29**		97		<1.0		<1.0		3.0		10		<1.0		<0.20		1.9		2.5		<1.0		<1.0		73	
	10/10/2012	<3.0		**27**		93		<1.0		<1.0		2.7		9.9		1.6		<0.20		1.6		2.4		<1.0		<1.0		86	
	4/18/2013	<3.0		**24**		85		<0.20	D1	<1.0		3.1		7.7		<1.0		<0.20		2.4		2.8		<1.0		<1.0		68	
	10/23/2013	<6.0	D1	**29**	D1	91		<1.0		<2.0	D1	5.8	D1	6.5	D1	<1.0		<0.20		2.4	D1	<4.0		<2.0	D1	<2.0	D1	72	D1
	4/10/2014	<3.0		**27**		84		<1.0		<1.0		5.2		10		1.3		<0.20		2.8		3.0		<1.0		<1.0		89	
	12/10/2014	<3.0		**20**	E4, H6	75	H6	<1.0		<1.0		10	H6	64	H6	3.6	E4, H6	<0.20		9.2	E4, H6	<2.0		0.60	E4, H6	<1.0		110	H6
	2/27/2015	<3.0		**15**	H6	79	H6	<1.0		<1.0		4.9	H6	43	H6	1.1	H6	<0.20		4.5	H6	3.1	H6	<1.0		<1.0		78	H6
	2/27/2015 [f]	<3.0		**14**	H6	78	H6	<1.0		<1.0		3.0	H6	40	H6	<1.0	H6	<0.20		3.5	H6	<2.0		<1.0		<1.0		67	H6
TOG-G9	3/28/2005	**7.2**	J	**15**	J	NA		NA		<5.0		5.9	J	6.2	J	<5.0		0.04	J	9.8	J	<20		<10		<1.0		85	
	5/23/2005	<10		**15**	J	NA		NA		<5.0		5.7	J	180		16		<0.20		<20		<20		<10		0.21	J	210	
	9/13/2005	3.8	J	**15**	J	NA		NA		<5.0		7.4	J	11	J	<5.0		<0.20		<20		<20		<10		<1.0		99	
	12/19/2005	NA		**20**		65		NA		<5.0		4.3	J	NA		<5.0		<0.20		NA		9.7	J	<10		NA			
	3/30/2006	NA		<20		60		NA		<5.0		3.8	J	NA		<5.0		<0.20		NA		12	J	<10	J6, J3	NA			
	6/20/2006	NA		<20		60		NA		<5.0		7.1	J	NA		<5.0		<0.20		NA		20		<10		NA			
	8/31/2006	<10		<20		62		NA		<5.0		<10		4.7	J	<5.0		<0.20		<20		<20		<10		<1.0		420	
	12/11/2006	<10		<20		NA		NA		<5.0		2.6	J	3.8	J	<5.0		<0.20		<20		<20		<10		0.22	J	160	
	3/22/2007	NA		**13**	J	64		NA		<5.0		4.7	J	NA		3.6	J.	<0.20		NA		<20		<10		NA			
	6/4/2007	NA		<20		66		NA		1.3	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA			
	9/17/2007	0.45	J	**28**		56		NA		<5.0		2.4	J	6.9	J	<5.0		0.06	J	<20		<20		<10		0.2	J	140	
	12/10/2007	<1.0		**32**		56		NA		1.4	J	5.3	J	4.8	J	<5.0		0.07	J	<20		<20		<10		<1.0		110	
	12/10/2007 [f]	<1.0		**30**		56		NA		1.4	J	4.5	J	22		<5.0		0.08	J	<20		<20		<10		<1.0		340	J
	3/18/2008	<1.0		**32**		56		NA		1.4	J	6.5	J	<20		3.5	J.	<0.20		<20		<20		6.7	J	<1.0		120	
	6/2/2008	<1.0		**16**		57		NA		1.6	J	3	J	17	J	<5.0		<0.20		<20		7	J	<10		<1.0		120	
	9/10/2008	<3.0		**27**		57		<1.0		<1.0		<10		22		1.7		<0.20		<10		<2.0		<10		<1.0		120	
	12/9/2008	<3.0		**39**		63		<1.0		1.3		<10		<10		2.8		<0.20		<10		<2.0		<10		<1.0		150	
	10/19/2010	<2.0		**14.7**		58		<2.0		<3.0		<10		<10		2.1		<0.20		<10		<2.0		<5.0		<0.50		102	
	4/12/2011	<40		<100		53		<1.0		<1.0		<10		13		<15		<0.20		<10		<100		<10		<100		82	
	10/13/2011	<6.0	D1	**29**	D1	67	D1	<1.0		<2.0	D1	8.3	D1	14	D1	1.6		<0.20		6.8	D1	<4.0	D1	<2.0	D1	<1.0		100	D1
	4/24/2012	<3.0		**19**		60		<1.0		<1.0		4.5		13		1.2		<0.20		2.0		2.5		<1.0		<1.0		83	
	10/10/2012	<3.0		**30**		61		<1.0		<1.0		9.4		5.6		<1.0		<0.20		1.6		2.5		<1.0		<1.0		75	
	4/18/2013	<3.0		**25**		57		<0.20	D1	<1.0		8.0		20		1.3		<0.20		2.8		2.8		<1.0		<1.0		75	
	10/23/2013	<3.0		**41**	D1	59		<1.0		<1.0		14	D1	11	D1	<1.0		<0.20		3.2	D1	<4.0		<1.0		<2.0	D1	100	D1
	4/10/2014	<3.0		**20**		53		<1.0		<1.0		6.9		10		<1.0		<0.20		3.4		2.1		<1.0		<1.0		82	
	12/10/2014	<3.0		**14**	E4, H6	44	H6	<1.0		<1.0		<10		<10		2.7	E4, H6	<0.20		<10		<2.0		<1.0		<1.0		73	H6
	2/27/2015	<3.0		8.7	H6	44	H6	<1.0		<1.0		<10		4.4	H6	<1.0		<0.20		4.1	H6	<2.0		<1.0		<1.0		76	H6

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6*** [a]		***10*** [b]		***2000*** [a]		***4*** [a]		***5*** [a]		***100*** [a]		***1,300*** [b,c]		***50*** [b,d]		***2*** [a]		[e]		***50*** [a]		***100*** [b]		***2*** [a]		***5,000*** [b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-G10	3/28/2005	<10		**110**		NA		NA		<5.0		30		21		<5.0		0.03	J	14	J	<20		<10		0.13	J	88	
	5/23/2005	<10		**21**		NA		NA		<5.0		4.4	J	60		<5.0		<0.20		<20		<20		<10		0.21	J	88	
	9/13/2005	<10		**22**		NA		NA		<5.0		4.9	J	6.4	J	<5.0		<0.20		<20		<20		<10		<1.0		44	
	12/19/2005	NA		**30**		57		NA		<5.0		3.6	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	12/19/2005 [f]	NA		**26**		55		NA		<5.0		3.1	J	NA		<5.0		<0.20		NA		<20		<10				NA	
	3/30/2006	NA		**24**		55		NA		<5.0		4.2	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/20/2006	NA		**15**	J	55		NA		<5.0		8	J	NA		<5.0		<0.20		NA		21		<10		NA		NA	
	8/31/2006	<10		7.9	J	57		NA		<5.0		<10		12	J	<5.0		<0.20		<20		<20		<10		<1.0		69	
	12/11/2006	<10		**19**	J	NA		NA		<5.0		2.8	J	16	J	<5.0		<0.20		<20		<20		<10		0.23	J	59	
	3/22/2007	NA		**23**		50		NA		<5.0		3	J	NA		<5.0		<0.20		NA		<20		<10		NA		NA	
	6/4/2007	NA		**22**		54		NA		1.8	J	2.5	J	NA		3.9	J	<0.20		NA		<20		<10		NA		NA	
	9/17/2007	0.45	J	**28**		51		NA		<5.0		<10		25		5.2		0.05	J	<20		<20		<10		0.2	J	71	
	12/10/2007	<1.0		**49**		53		NA		1.5	J	6.3	J	6.7	J	<5.0		0.07	J	<20		<20		<10		<1.0		58	
	3/18/2008	<1.0		**44**		52		NA		1.7	J	7.6	J	28		5.9		<0.20		<20		<20		4.4	J	<1.0		74	
	6/2/2008	0.49	J	**30**		56		NA		1.8	J	3.6	J	<20		<5.0		<0.20		<20		<20		<10		<1.0		62	
	9/10/2008	<3.0		**38**		56		<1.0		<1.0		<10		12		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	12/9/2008	<3.0		**37**		56		<1.0		1.3		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
	10/19/2010	<2.0		**49.2**		66		<2.0		<3.0		<10		11		2.47		<0.20		<10		<2.0		<5.0		<0.50		104	
	4/12/2011	<40		<100		59		<1.0		<1.0		<10		25		<15		<0.20		<10		<100		<10		<100		83	
	10/13/2011	<6.0	D1	**27**	D1	58	D1	<1.0		<2.0	D1	4.2	D1	5.7	D1	<1.0		<0.20		4.7	D1	<4.0	D1	<2.0	D1	<1.0		200	D1
	4/28/2012	<3.0		<1.0		42		<1.0		6.6		73		350		37		<0.20		32		2.8		<1.0		<1.0		1600	
	10/10/2012	<3.0		**30**		53		<1.0		<1.0		4.7		6.1		<1.0		<0.20		3.3		<2.0		<1.0		<1.0		94	
	4/18/2013	<3.0		**57**		50		<0.50	D1	<1.0		9.6		8.7		<1.0		<0.20		3.8		<2.0		<1.0		<1.0		100	
	4/18/2013 [f]	<3.0		**47**		51		<0.20	D1	<1.0		9.5		15		1.1		<0.20		4.0		<2.0		<1.0		<1.0		310	
	10/23/2013	<3.0		**75**		56		<1.0		<1.0		13		9.7		<1.0		<0.20		4.5		<2.0		<1.0		<1.0		200	
	4/10/2014	<3.0		**100**		58		<1.0		<1.0		16		12		<1.0		<0.20		4.5		<2.0		<1.0		<1.0		140	
	12/10/2014	<3.0		**21**	E4, H6	48	H6	<1.0		<1.0		<10		14	H6	<1.0		<0.20		1.1	E4, H6	<2.0		0.74	E4, H6	<1.0		41	E4, H6
	2/27/2015	<3.0		**16**	H6	50	H6	<1.0		<1.0		<10		27	H6	<1.0		<0.20		5.9	H6	<2.0		<1.0		<1.0		64	H6
TOG-R1	4/10/2014	<3.0		4.3		45		<1.0		<1.0		4.1		5.4		<1.0		<0.20		4.6		3.3		<1.0		<1.0		17	
	12/10/2014	5.7	E4, H6	**10**	E4, H6	44	H6	<1.0		<1.0		4.0	E4, H6	<10		<1.0		<0.20		<10		<2.0		0.64	E4, H6	<1.0		34	E4, H6
	2/27/2015	<3.0		4.1	H6	44	H6	<1.0		<1.0		3.9	H6	6.4	H6	<1.0		<0.20		6.6	H6	3.6	H6	<1.0		<1.0		77	H6
MW-EQ	3/29/2005	<10		<20		NA		NA		<5.0		<10		<20		<5.0		0.03	J	14	J	<20		<10		0.13	J	<30	
MW-EQ	5/23/2005	<10		<20		NA		NA		<5.0		<10		8.6	J	<5.0		<0.20		<20		<20		<10		0.2	J	12	J
MW-EQ	9/12/2005	3.8	J	<20		NA		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW-EQ	12/19/2005	NA		<20		10		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
MW-EQ	3/30/2006	NA		<20		8		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
MW-EQ	6/21/2006	NA		<20		<5.0		NA		<5.0		<10		NA		<5.0		0.064	J	NA		46		12		NA		NA	
MW-EQ	8/30/2006	<10		<20		<5.0		NA		<5.0		<10		7	J	<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW EQ1	12/11/2006	<10		<20		NA		NA		0.7	J	<10		<20		<5.0		<0.20		<20		<20		<10		0.19	J	<30	
MW-EQ-2	12/12/2006	<10		<20		NA		NA		0.8	J	<10		<20		<5.0		<0.20		<20		<20		<10		0.19	J	<30	
MW EQ1	3/21/2007	NA		<20		<5.0		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
MW-EQ-2	3/23/2007	NA		<20		<5.0		NA		<5.0		<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
MW-EQ1	6/4/2007	NA		<20		9		NA		1.3	J	<10		NA		<5.0		<0.20		NA		<20		<10		NA		NA	
MW-EQ2	6/5/2007	NA		<20		8.6		NA		<5.0		<10		NA		2.5	J	<0.20		NA		18	J	<10		NA		NA	
MW-EQ1	9/17/2007	0.48	J	0.5		1.5	J	NA		0.9	J	<10		<20		2.8	J	<0.20		<20		<20		<10		0.19	J	<30	
MW-EQ2	9/18/2007	0.4	J	<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		3.3	J	0.18	J	<30	
MW-EQ3	9/19/2007	<1.0		<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW-EQ3	12/12/2007	<1.0		<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW-EQ2	12/11/2007	<1.0		<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW-EQ1	12/10/2007	<1.0		0.23	J	<5.0		NA		<5.0		<10		<20		<5.0		0.12	J	<20		<20		<10		<1.0		<30	
MW-EQ1	3/18/2008	<1.0		<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		2.9	J	<1.0		<30	
MW-EQ2	3/19/2008	<1.0		<1.0		<5.0		NA		<5.0		<10		2.4	J	<5.0		<0.20		<20		<20		<10		<1.0		<30	
MW-EQ3	3/20/2008	<1.0	J	<1.0		5.1		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
EQ-1	6/2/2008	<1.0		<1.0		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
EQ-2	6/3/2008	0.84	J	1.2		<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
EQ-3	6/4/2008	0.72	J	0.59	J	<5.0		NA		<5.0		<10		<20		<5.0		<0.20		<20		<20		<10		<1.0		<30	
EQ-4	6/5/2008	<1.0		<1.0		<5.0		NA		1.6	J	<10		<20		4	J	<0.20		13	J	13	J	<10		<1.0		<30	
EQ-1	9/8/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-2	9/9/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-3	9/10/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-4	9/11/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-1	12/9/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-2	12/10/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-3	12/11/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
EQ-4	12/12/2008	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	

TABLE 7
Historical Groundwater Analytical Results for Metals
Cooper and Commerce WQARF Site

Method		6010B		6010B		6010B		6010b		6010B		6010B		6010B		6010B		7470A		6010B		6010B		6010B		6020		6010B	
Parameter		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
Units		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
	MCL/AWQS:	***6*** [a]		***10*** [b]		***2000*** [a]		***4*** [a]		***5*** [a]		***100*** [a]		***1,300*** [b,c]		***50*** [b,d]		***2*** [a]		[e]		***50*** [a]		***100*** [b]		***2*** [a]		***5,000*** [b]	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
QCEB-20141210-1	12/10/2014	<3.0		7.4	E4	<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		<10		<1.0		<50	
QCEB-20141211-2	12/11/2014	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		0.58	E4	<1.0		<50	
QCEB-20141212-2	12/12/2014	<3.0		<1.0		<10		<1.0		<1.0		<10		<10		<1.0		<0.20		<10		<2.0		0.53	E4	<1.0		<50	

Notes:
a Aquifer Water Quality Stanc
b Secondary MCL
c The copper standard is treatment technique action level and MCL goal.
d The lead standard is treatment technique action level; the MCL is zero.
e The MCL for Nickel has been remanded.
f Duplicate sample

Only analytes that have been detected are summarized in this table.
NA = Not Analyzed
MW-DP = Duplicate Sample
MW-EQ = Equipment Blank Sample
As of September 2008 groundwater samples were not collected or analyzed for calcium, magnesium, potassium, and sodium

Qualifiers:

H	RIN(EPA)-Re-Analyzed: The indicated analytical results were generated from a reinjection of the same sample extract or aliquot.
U	BDL (EPA) - Below Detectable Limits: Indicates that the compound was analyzed but not detected.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J8	The internal standard associated with this data responded abnormally low. The data is likely to show a high bias concerning the result.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
B	(EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
D1	Sample required dilution due to matrix.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
E4	Concentration estimated; Analyte was detected below laboratory minimum reporting level, but above MDL.
H6	Filtration was not done within 15 minutes of sampling, the sample was filtered in the laboratory.

TABLE 8
Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250***^{b}		**250**^{a}		**10**^{b}		**250**^{a}		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
EFFLUENT	8/31/2006	59		19		21		**270**		**370**	H	2.9		120		150		150		0	J
	12/11/2006	55		18		18		**260**		**390**		1.9	T8	110				160		0	J
	3/23/2007	81		28		5.1		**240**		**500**		3.4		110		140					
	6/4/2007	59		21		21		**260**		**390**		3.8		140				170			
	9/17/2007	60		18		22		**290**		**450**		3.5		100				170			
	12/10/2007	58		18		21		**270**		**450**		2.6		100				130			
	3/19/2008	45		17		20		190		**280**		4.3		83				140			
	6/2/2008	48		16		21		220		**300**		3.0		68				290			
EW-101	6/20/2006	54		19		5.3		**330**	B	**370**	H	**11**		160		220		220			J
	8/30/2006	57		20		4.7		**340**	V	**390**	H	**10**		160		230		230			J
	12/12/2006	60		21		5.4		**340**		**420**		**11**		160				210			J
	3/22/2007	63		22		4.6		**300**		**420**		9.6		140		210					
	6/4/2007	60		21		4.7		**320**		**380**		7.6		130				240			
	9/19/2007	57		20		4.9		**320**		**370**		6.3		130				230			
	12/12/2007	59		21		4.6		**300**		**340**		6.9		130				210			
	3/20/2008	61		22		4.7		**320**		**400**		7.2		130				220			
	6/5/2008	62		22		4.6		**320**		**430**		5.8		120				230			
	9/11/2008	NA		NA		NA		NA													
	12/12/2008																				
MW-101	6/20/2006	55		20		4.5		**290**	B												
	8/30/2006	59		20		4.7		**310**		**390**	H	3.8		130		250		250			J
	12/12/2006	56		20		4.6		**300**		**380**		4.2		130				220			J
	3/21/2007	58		21		4.4		**290**													
	6/4/2007	NA		NA		NA		NA													
	9/18/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	12/12/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	3/19/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	6/4/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	9/11/2008	NA		NA		NA		NA													
	12/11/2008																				
MW-102	3/29/2005	NA		NA		NA		NA													
	5/23/2005	NA		NA		NA		NA													
	9/12/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/30/2006	NA		NA		NA		NA													
	6/21/2006	58		21		4.4		**320**													
	8/30/2006	63		22		4.9		**330**		**400**	H	5		140		250		250			J
	12/11/2006	62		22		4.6		**310**		**390**		5.6		140				220			J
	3/21/2007	58		21		4.3		**300**													
	6/5/2007	59		21		4.4		**300**		**400**		5.1		120				240			
	9/18/2007	61		22		5		**320**		**400**		5		120				230			
	12/12/2007	62		22		4.4		**300**		**410**		5.2		120				220			
	3/20/2008	66		24		4.7		**330**		**440**		5.2		120				220			
	6/5/2008	67		24		4.6		**330**		**440**		5.1		120				240			
	9/10/2008	NA		NA		NA		NA													
	12/11/2008																				

TABLE 8
Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
MCL/AWQS:		***None***		***None***		***None***		***250*** [b]		**250**[a]		**10**[b]		**250**[a]		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-103	3/29/2005	NA		NA		NA		NA													
	5/23/2005	NA		NA		NA		NA													
	9/12/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/30/2006	NA		NA		NA		NA													
	6/21/2006	53		20		4.4		**250**		**320**	H	4.4		110		210		210			J
	8/30/2006	55		20		4.5		**290**		**320**	H	5.3		110		220		220			J
	12/12/2006	52		19		4.4		**270**		**360**		5.5		120				200			J
	3/23/2007	67		23		4.9		**340**		**440**		5.3		130		230					
	6/5/2007	NA		NA		NA		NA													
	9/19/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	12/12/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
	3/19/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
	6/4/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
	9/10/2008	NA		NA		NA		NA													
	12/12/2008																				
MW-104S	3/28/2005																				
	5/23/2005																				
	9/12/2005																				
	12/19/2005																				
	3/30/2006																				
	6/20/2006	73		26		5		**300**	B	**300**	H	6.2		130		360		360			J
	8/31/2006	55		18		4.3		**260**		**190**	H	6.2		98		400		400			J
	12/11/2006	79		28		5		**300**		**390**		6.6		140				310			J
	3/22/2007	86		30		5.1		**330**		**410**		6.9		140		310					
	6/4/2007	96		32		5.4		**340**		**410**		**10**		160				340			
	9/19/2007	93		32		5.7		**340**		**430**		8.4		160				300			
	12/12/2007	89		31		5.2		**320**		**400**		6.9		150				280			
	3/19/2008	85		29		5.4		**330**		**390**		7.3		150				310			
	6/3/2008	87		30		5.4		**350**		**460**		6		150				300			
	9/10/2008	NA		NA		NA		NA													
	12/11/2008																				
MW-104D	3/28/2005	NA		NA		NA		NA													
	5/27/2005	NA		NA		NA		NA													
	9/13/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/31/2006	NA		NA		NA		NA													
	6/15/2006	NA		NA		NA		NA													
	8/1/2006	NA		NA		NA		NA		**430**	H	6.1		120		130		130			J
	12/15/2006	94		40		7.8		240													
	3/22/2007	71		30		6.8		200													
	6/6/2007	NA		NA		NA		NA													
	9/19/2007	NA		NA		NA		NA													
	12/21/2007	NA		NA		NA		NA													
	3/19/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	6/3/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	9/8/2008	NA		NA		NA		NA													
	12/10/2008																				

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Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250***[b]		**250**[a]		**10**[b]		**250**[a]		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-105	6/21/2006	65		22		5		**360**		**420**	H	6		130		290		290			J
	8/31/2006	63		21		5.6		**350**		**430**	H	5.8		130		310		310			J
	12/12/2006	61		21		4.6		**340**		**410**		5.8		130				290			J
	3/23/2007	60		19		20		**290**		**440**		5.8		130		290					
	6/5/2007	71		25		4.6		**360**		**440**		6.8		120				330			
	9/18/2007	66		23		5.4		**380**		**430**		7.1		120				320			
	12/11/2007	66		22		4.5		**350**		**470**		7.6		120				290			
	3/19/2008	59		20		4.7		**340**		**410**		5.8		110				270			
	6/4/2008	63		22		4.8		**360**		**460**		6.8		120				320			
	9/9/2008	NA		NA		NA		NA													
	12/11/2008																				
MW-106	12/11/2006	75		26		4.8		**330**		**420**		7.7		150				240			J
	3/23/2007	130		29		7.7		**130**		**51**		1.1		15		250					
	6/4/2007	85		29		5.2		**380**		**500**		8.7		150				270			
	9/18/2007	79		27		5.4		**380**		**480**		9.4		150				270			
	12/11/2007	73		25		4.7		**350**		**460**		9.1		140				240			
	3/18/2008	70		24		5.1		**360**		**490**		8.2		140				260			
	6/4/2008	74		25		4.8		**370**		**500**		8.7		150				300			
	9/9/2008	NA		NA		NA		NA													
	12/11/2008																				
MW-107	6/6/2007	73		25		5.2		**330**		**470**		5.1		140		300		300			
	9/17/2007	91		31		5.3		**390**		**550**		7.2		150		340		340			
	12/10/2007	87		31		6.6		**370**		NA		7.7		160				290			
	3/17/2008	86		30		5.5		**390**		**750**		7.2		140				320			
	6/2/2008	80		28		5.3		**320**		**490**		7.3		150				330			
	9/9/2008	NA		NA		NA		NA													
	12/9/2008																				
MW-108	6/7/2007	77		27		5.2		**310**		**440**		6.5		120		310		310			
	9/17/2007	100		37		5.3		**340**		**460**		8.2		140		320		320			
	12/10/2007	81		29		5		**310**		**380**		8		120				280			
	3/18/2008	97		33		5.7		**330**		**440**		7.5		140				300			
	6/3/2008	92		33		6.1		**310**		**460**		7.4		150				330			
	9/9/2008	NA		NA		NA		NA													
	12/10/2008																				
MW-109	6/7/2007	87		30		5.4		**320**		**430**		5.2		140		300		300			
	9/17/2007	110		37		5.4		**380**		**580**		8.4		140		320		320			
	12/10/2007	110		37		5.9		**380**		NA		9.9		150		320		320			
	3/18/2008	100		35		6		**380**		**580**		8.7		130				330			
	6/3/2008	98		35		5.5		**390**		**550**		8.8		150				370			
	9/9/2008	NA		NA		NA		NA													
	12/10/2008																				

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Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250^{b}***		**250^{a}**		**10^{b}**		**250^{a}**		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-110	3/18/2008	110		37		6		**350**		510		8.1		150				300			
	6/3/2008	110		39		5.7		**370**		550		8.2		170				320			
	9/8/2008	NA		NA		NA		NA													
	12/10/2008																				
MW-111	3/17/2008	89		31		5.3		**360**		**470**		6.2		150				290			
	6/2/2008	83		28		5		**300**		**480**		6.4		150				350			
	9/8/2008	NA		NA		NA		NA													
	12/9/2008																				
MW-112	3/17/2008	66		23		5.4		**350**		**370**		5.6		130				310			
	6/2/2008	61		22		4.8		**280**		**380**		5		130				330			
	9/8/2008	NA		NA		NA		NA													
	12/9/2008																				
TOG-G7	3/28/2005	NA		NA		NA		NA													
	5/23/2005	NA		NA		NA		NA													
	9/13/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/30/2006	NA		NA		NA		NA													
	6/20/2006	60		22		4.9		**310**	B	**380**	H	3.6		130		270		270			J
	8/31/2006	59		21		4.9		**330**		**380**	H	3.6		130		250		250			J
	12/11/2006	58		20		4.9		**320**		**380**		3.6	T8	130	J6			240			J
	3/22/2007	57		21		4.6		**300**		**380**		4.1		110		21					
	6/4/2007	65		24		4.7		**300**		**380**		6.1		120				240			
	9/17/2007	65		24		5.2		**330**		**460**		4.7		120				240			
	12/10/2007	59		21		4.6		**320**		**430**		4.6		110				200			
	3/18/2008	62		22		5.1		**330**		**490**		5.1	T8	94				200			
	6/2/2008	69		25		5.4		**340**		**490**		4.8		110				240			
	9/10/2008	NA		NA		NA		NA													
	12/9/2008																				
TOG-G8	3/28/2005	NA		NA		NA		NA													
	5/23/2005	NA		NA		NA		NA													
	9/13/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/30/2006	NA		NA		NA		NA													
	6/20/2006	62		22		6.1		**350**	B	**430**	H	6.4		140		280		280			J
	8/31/2006	61		21		5.8		**350**		**410**	H	6.6		140		270	J6	270			J
	12/11/2006	55		19		6.7		**340**		**420**		6.2	T8	140				250			J
	3/22/2007	61		21		5.8		**350**		**450**		6.5		130		250					
	6/4/2007	NA		NA		NA		NA													
	9/17/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	12/10/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	3/18/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	6/2/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	9/10/2008	NA		NA		NA		NA													
	12/9/2008																				

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Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250^b***		**250^a**		**10^b**		**250^a**		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
TOG-G9	3/28/2005	NA		NA		NA															
	5/23/2005	NA		NA		NA															
	9/13/2005	NA		NA		NA															
	12/19/2005	NA		NA		NA															
	3/30/2006	NA		NA		NA															
	6/20/2006	82		28		5.1		**340**	B	**470**	H	7.5		140		300		300			J
	8/31/2006	86		28		5.1		**330**		**400**	H	8		140		310		310			J
	12/11/2006	85		29		4.9		**320**		**470**		6.6	T8	140		290		280			J
	3/22/2007	91		31		5.2		**350**		**460**		6.6		150							
	6/4/2007	95		32		5.1		**340**		**430**		**11**		150				320			
	9/17/2007	89		30		5		**330**		**500**		5.8		150				270			
	12/10/2007	83		29		5		**340**		**490**		6.7		150				270			
	3/18/2008	85		29		5.7		**340**		**470**		5.5		130				280			
	6/2/2008	90		30		5.3		**340**		**470**		4.8		140				300			
	9/10/2008	NA		NA		NA		NA													
	12/9/2008																				
TOG-G10	3/28/2005	NA		NA		NA		NA													
	5/23/2005	NA		NA		NA		NA													
	9/13/2005	NA		NA		NA		NA													
	12/19/2005	NA		NA		NA		NA													
	3/30/2006	NA		NA		NA		NA													
	6/20/2006	60		22		4.5		**330**	B	**410**	H	4.7		150		260	B	260			J
	8/31/2006	64		22		5		**350**		**400**	H	4.6		140		260		260			J
	12/11/2006	63		22		4.5		**320**		**410**		5	T8	140				240			J
	3/22/2007	60		21		4.3		**310**		**390**		5.1		140		250					
	6/4/2007	NA		NA		NA		NA													
	9/17/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	12/10/2007	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	3/18/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	6/2/2008	NA		NA		NA		NA		NA		NA		NA		NA		NA			
	9/10/2008	NA		NA		NA		NA													
	12/9/2008																				

TABLE 8
Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250***^{b}		**250**^{a}		**10**^{b}		**250**^{a}		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-DP (MW-103)	3/29/2005	NA		NA		NA		NA													
MW-DP (MW-102)	5/23/2005	NA		NA		NA		NA													
MW-DP (MW-103)	9/12/2005	NA		NA		NA		NA													
MW-DP (G10)	12/19/2005	NA		NA		NA		NA													
MW-DP (MW-103)	3/30/2006	NA		NA		NA		NA													
MW-DP (MW-102)	6/21/2006	62		22		4.4		**320**		**410**	H	4.6		130		250	J6	250			J
MW-DP (MW-105)	8/31/2006	64		22		4.8		**340**		**390**	H	5.7		120		300		300			J
MW-112 (MW-105)	12/12/2006	60		21		5.1		**360**													
EW-112 (EW-101)	3/22/2007	NA		23		4.6		**310**		**390**		9.4		140		210					
MW-212(MW-104S)	6/4/2007	96		33		5.5		**340**													
MW-312(MW-102)	6/5/2007	60		21		4.4		**300**													
MW-212(MW-105)	9/18/2007	67		23		5.5		**370**													
MW-312(EW-101)	9/19/2007	57		20		4.7		**320**													
MW-212(EW-101)	12/12/2007	59		21		4.6		**300**													
MW-312(MW-G9)	12/10/2007	82		28		5		**330**		**480**		6.6		150				260			
MW-212(MW-106)	3/18/2008	74		28		4.6		**350**		**450**		8.4		140				270			
MW-312(MW-102)	3/20/2008	66		24		4.7		**330**		**450**		5.2		120				230			
MW-212(MW-106)	6/4/2008	73		25		4.6		**360**		**490**		8.7		150				300			
MW-312(MW-102)	6/5/2008	68		25		4.7		**330**		**460**		5.1		120				210			
MW-212(MW-106)	9/9/2008	NA		NA		NA		NA													
MW-312(MW-102)	9/10/2008	NA		NA		NA		NA													
MW-212(MW-106)	12/11/2008																				
MW-312(MW-103)	12/12/2008																				

TABLE 8
Historical Groundwater Analytical Results for Major Ions
Cooper and Commerce WQARF Site

		Cations								Anions											
Method		6010B		6010B		6010B		6010B		9056		9056		9056		310.2		310.2		310.2	
Parameter		Calcium,Dissolved		Magnesium,		Potassium,Dissolved		Sodium,Dissolved		Chloride		Nitrate		Sulfate		Alkalinity		Alkalinity,Bicarbonate		Alkalinity,Carbonate	
Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	MCL/AWQS:	***None***		***None***		***None***		***250 ^{b}***		**250^a**		**10^b**		**250^a**		**NA**		**NA**		**NA**	
Client Sample ID	**Collect Date**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**
MW-EQ	3/29/2005	NA		NA		NA		NA													
MW-EQ	5/23/2005	NA		NA		NA		NA													
MW-EQ	9/12/2005	NA		NA		NA		NA													
MW-EQ	12/19/2005	NA		NA		NA		NA													
MW-EQ	3/30/2006	NA		NA		NA		NA													
MW-EQ	6/21/2006	3.1		0.43		0.15	J	6.8													
MW-EQ	8/30/2006	NA		NA		NA		NA													
MW EQ1	12/11/2006	NA		NA		NA		NA													
MW-EQ-2	12/12/2006	1.5		0.51		0.34	J	8.7													
MW EQ1	3/21/2007	NA		NA		NA		NA													
MW-EQ-2	3/23/2007	NA		NA		NA		NA													
MW-EQ1	6/4/2007	NA		NA		NA		NA													
MW-EQ2	6/5/2007	NA		NA		NA		NA													
MW-EQ1	9/17/2007	NA		NA		NA		NA													
MW-EQ2	9/18/2007	NA		NA		NA		NA													
MW-EQ3	9/19/2007	NA		NA		NA		NA													
MW-EQ3	12/12/2007	NA		NA		NA		NA													
MW-EQ2	12/11/2007	NA		NA		NA		NA													
MW-EQ1	12/10/2007	NA		NA		NA		NA													
MW-EQ1	3/18/2008	0.24	J	NA		0.36	J	0.37	J												
MW-EQ2	3/19/2008	NA		NA		NA		NA													
MW-EQ3	3/20/2008	NA		NA		NA		NA													
EQ-1	6/2/2008	NA		NA		NA		NA													
EQ-2	6/3/2008	NA		NA		NA		NA													
EQ-3	6/4/2008	NA		NA		NA		NA													
EQ-4	6/5/2008	NA		NA		NA		0.3	J												
EQ-1	9/8/2008	NA		NA		NA		NA													
EQ-2	9/9/2008	NA		NA		NA		NA													
EQ-3	9/10/2008	NA		NA		NA		NA													
EQ-4	9/11/2008	NA		NA		NA		NA													
EQ-1	12/9/2008																				
EQ-2	12/10/2008																				
EQ-3	12/11/2008																				
EQ-4	12/12/2008																				

Notes:

^{a} *Secondary MCL*	*NA = Not Analyzed*
^{b} *Aquifer Water Quality Standard*	*MW-DP = Duplicate Sample*
	MW-EQ = Equipment Blank Sample

Qualifiers:

H	*RIN(EPA)-Re-Analyzed: The indicated analytical results were generated from a reinjection of the same sample extract or aliquot.*
J6	*The sample matrix interfered with the ability to make any accurate determination; spike value is low.*
J	*(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.*
B	*(EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.*
V	*(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.*
T8	*Samples received past/too close to holding time expiration.*
Bold	Values exceed MCL

TABLE 9
Historic PCE and TCE Concentrations in On-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	PCE Concentrations (µg/L)				TCE Concentrations (µg/L)			
	MW-101	MW-102	MW-103	EW-101	MW-101	MW-102	MW-103	EW-101
1/27/1995	**900**	**53**	**140**	Well Installed March 2006	1.0	<1.0	<1.0	Well Installed March 2006
3/22/1995	**2,800**	**3,000**	**300**		3.6	4.0	2.0	
7/17/1995	**5,800**	**930**	**200**		<125	<10	<2.5	
10/26/1995	**4,200**	**290**	**400**		<25	<2.5	2.5	
1/29/1996	**5,500**	**3,900**	**370**		<250	<50	<5	
4/30/1996	**4,600**	**700**	**310**		<100	<50	<5	
7/23/1996	**5,400**	**660**	**800**		<250	<25	<25	
10/25/1996	**6,600**	**1,100**	**1,100**		<100	<50	<50	
1/22/2002	NS (*Well Damaged*)	**1,300**	**149**		NS (*Well Damaged*)	ND	ND	
3/29/2005		**18**	**27**			0.3	4.2	
5/23/2005		**24**	**36**			<1.0	<1.0	
9/12/2005		**19**	**300**			<1.0	<1.0	
12/19/2005		**270**	**300**			0.59	0.57	
3/31/2006		**330**	**450**			0.62	0.67	
6/21/2006	**420**	**760**	**500**	**1,200**	0.44	0.44	0.83	<1.0
8/30/2006	**270**	**390**	**460**	**1,700**	<1.0	0.51	0.65	1.3
12/12/2006	**130**	**160**	**150**	**540**	0.56	0.66	0.77	2.1
3/22/2007	**1600**	**810**	**250**	**730**	1.10	<10	0.33	1.9
6/4/2007	**400**	**520**	**300**	**800**	0.63	<1.0	<1.0	0.9
9/18/2007	**300**	**310**	**140**	**940**	<1.0	<1.0	<1.0	<10
12/11/2007	**280**	**120**	**94**	**780**	<10	<1.0	<1.0	<10
3/19/2008	**160**	**65**	**26**	**680**	<1.0	<1.0	<1.0	0.45
6/2/2008	**57**	**64**	**52**	**230**	<1.0	<1.0	<1.0	<1.0
9/10/2008	**24**	**200**	**99**	**280**	<1.0	<1.0	<1.0	<1.0
12/9/2008	**20**	**230**	**110**	**290**	<0.50	<0.50	<0.50	0.57
5/29/2010	**14**	**330**	**8.0**	NS	<1.0	<5.0	<1.0	NS
10/21/2010	**222**	**245**	**95.0**	**89.6**	<0.500	1.92	<0.500	<0.500
1/31/2011	**126.0**	**124.0**	**124.0**	NS	<0.500	0.730	<0.500	NS
4/15/2011	**110**	**130**	**49**	**53**	<0.500	0.99	<0.500	<0.500
10/14/2011	**15**	**130**	**7.1**	**37**	<0.50	1.2	<0.50	<0.50
1/26/2012	**18**	**43**	2.4	NS	<0.50	<0.50	<0.50	NS
4/27/2012	**17**	**140**	**22**	**23**	<0.50	2.0	<0.50	<0.50
10/12/2012	**19**	**75**	4.6	**15**	<0.50	1.2	<0.50	<0.50
1/29/2013	**11**	**14**	1.8	NS	<0.50	<0.50	<0.50	NS
4/19/2013	**6.9**	**23**	0.93	**6.4**	<0.50	<0.50	<0.50	<0.50
7/16/2013	**11**	**15**	1.4	NS	<0.50	<0.50	<0.50	NS
10/25/2013	4.3	**13**	0.64	**5.0**	<0.50	<0.50	<0.50	<0.50
1/17/2014	3.7	**15**	0.65	NS	<0.50	<0.50	<0.50	NS
4/15/2014	3.1	**8.1**	<0.50	2.4	<0.50	<0.50	<0.50	<0.50
7/17/2014	1.5	**6.5**	<0.50	NS	<0.50	<0.50	<0.50	NS
12/12/2014	0.71	0.30	<0.50	NS	<0.50	<0.50	<0.50	NS

TABLE 9
Historic PCE and TCE Concentrations in On-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	PCE Concentrations (µg/L)				TCE Concentrations (µg/L)			
	MW-101	MW-102	MW-103	EW-101	MW-101	MW-102	MW-103	EW-101
2/26/2015	2.0	<0.50	<0.50	NS	<0.50	<0.50	<0.50	NS

Notes:
PCE = Tetrachloroethene
TCE = Trichloroethene
µg/L = Micrograms per liter
NS = Not sampled
ND = Not detected, detection level not provided

The Aquifer Water Quality Standard (AWQS) for both PCE and TCE is 5 µg/L.

Concentrations greater than the AWQS are in ***bold***.

MW-102 PCE/TCE concentrations for the 7/17/14 event are for PDB samples set at a depth of 122-124'.

TABLE 10
Historic PCE and TCE Concentrations in Off-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	PCE Concentrations (µg/L)																	
	G-9	**G-10**	**MW-104S**	**MW-105**	**MW-106**	**MW-107**	**MW-108**	**MW-109**	**MW-110**	**MW-111**	**MW-112**	**MW-113**	**MW-114**	**MW-115**	**MW-116**	**MW-117**	**MW-118**	**MW-119S**
8/7/2003			**16**	Well Installed 6/6/06	Well Installed 9/21/06	Well Installed 5/14/07	Well Installed 5/16/07	Well Installed 5/21/07	Well Installed 2/21/08	Well Installed 2/20/08	Well Installed 2/19/08	Well Installed 6/27/11	Well Installed 7/7/11	Well Installed 9/5/13	Well Installed 8/27/13	Well Installed 8/29/13	Well Installed 9/8/13	Well Installed 9/12/13
9/4/2003			**5.8**															
12/8/2003			**17**															
3/10/2004			**10**															
6/4/2004			**12**															
9/20/2004			**11**															
12/8/2004			**11.1**															
3/29/2005	3.7	1.6	**7.6**															
5/23/2005	**5.1**	2.7	**10**															
9/12/2005	**12**	**7.8**	2.6															
12/19/2005	**22**	**13**	**5.1**															
3/31/2006	**20**	**6.5**	**13**															
6/21/2006	**28**	**18**	**21**	**130**														
8/30/2006	**32**	**50**	**14**	**47**														
12/12/2006	**39**	**120**	**27**	**94**	**30**													
3/22/2007	**41**	**54**	**32**	**490**	**19**													
6/4/2007	**27**	**200**	**22**	**110**	**35**	**16**	0.88	**16**										
9/18/2007	**48**	**29**	**31**	**140**	**55**	**7.3**	3.5	**16**										
12/11/2007	**39**	**13**	**32**	**58**	**49**	4.9	1.2	**17**										
3/17/2008	**35**	1.7	**30**	**63**	**100**	4	**5.1**	**15**	**15**	**8.1**	<1.0							
6/2/2008	**38**	**6.3**	**25**	**36**	**120**	4.6	**5.4**	**19**	**37**	**11**	<1.0							
9/10/2008	**31**	**39**	**28**	**52**	**58**	**6.3**	**7.6**	**24**	**38**	**13**	<0.5^{a}							
12/9/2008	**34**	**87**	**25**	**45**	**37**	**8.2**	**7.2**	**20**	**36**	**14**	<0.50							
5/29/2010	**29**		**30**															
6/28/2010		**77**		**32**	**19**	3.6	**11**	**16**	**31**	**14**	<1.0							
10/20/2010	**30.7**	**135**	**30.7**	**10.3**	**32.4**	**9.05**	**11.9**	**19.4**	**30.1**	**23.9**	<0.500							
1/31/2011		**165.0**	**30.0**	**12.3**	**30.8**													
4/15/2011	**31**	**130**	**34**	**11**	**28**	3.6	**12**	**20**	**28**	**24**	<0.500							
10/14/2011	**33**	**150**	**33**	**12**	**31**	2.5	**15**	**24**	**31**	**21**	<0.50	3.0	**20**					
1/26/2012		**66**	**32**	**12**	**33**													
4/27/2012	**33**	1.3	**23**	**7.8**	**29**	2.6	**14**	**17**	**18**	**18**	<0.50	2.6	**18**					
10/12/2012	**31**	**22**	**23**	**4.4**	**31**	1.7	**13**	**20**	**23**	**10**	<0.50	0.70	**19**					
1/29/2013		**5.4**	**25**	**43**	**46**													
4/19/2013	**23**	2.5	**20**	**12**	**46**	1.3	**12**	**18**	**20**	**6.1**	<0.50	0.56	**14**					
7/16/2013		2.0	**28**	**7.4**	**59**													
10/25/2013	**30**	1.6	**19**	**5.2**	**40**	1.0	**11**	**17**	**19**	**4.5**	<0.50	<0.50	**11**	**11**	**25**	**32**	<0.50	**11**
1/17/2014		1.0	**31**	**8.8**	**28**													**6.3**
4/15/2014	**45**	0.87	**27**	**9.0**	**19**	0.61	**12**	**18**	**22**	4.2	<0.50	0.76	**9.6**	**6.1**	**19**	**13**	<0.50	4.3
7/17/2014		<0.50	**31**	**7.6**	**11**													3.6
12/12/2014	**30**	0.52	**10**	0.51	4.8	<0.50	2.7	**15**	**11**	1.3	<0.50	1.2	4.3	1.2	**12**	1.9	<0.50	0.42

TABLE 10
Historic PCE and TCE Concentrations in Off-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	**PCE Concentrations (µg/L)**																	
	G-9	**G-10**	**MW-104S**	**MW-105**	**MW-106**	**MW-107**	**MW-108**	**MW-109**	**MW-110**	**MW-111**	**MW-112**	**MW-113**	**MW-114**	**MW-115**	**MW-116**	**MW-117**	**MW-118**	**MW-119S**
2/26/2015	**29**	<0.50	**22**	1.4	3.7	<0.50	**6.7**	**18**	**17**	2.2	<0.50	1.2	**5.6**	1.9	**16**	**6.0**	<0.50	<0.50

Notes:

PCE = Tetrachloroethene
TCE = Trichloroethene
µg/L = Micrograms per liter
[a] = Reporting level for PCE and TCE was 1.0 µg/L prior to 9/08 and 0.5 µg/L after 9/08

The Aquifer Water Quality Standard (AWQS) for both PCE and TCE is 5 µg/L. PCE and TCE concentrations greater than the AWQS are in ***bold.***

G-10 sample for 4/27/12 event was obtained with a bailer because the dedicated pump was not operable.

TABLE 10
Historic PCE and TCE Concentrations in Off-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	TCE Concentrations (µg/L)																	
	G-9	**G-10**	**MW-104S**	**MW-105**	**MW-106**	**MW-107**	**MW-108**	**MW-109**	**MW-110**	**MW-111**	**MW-112**	**MW-113**	**MW-114**	**MW-115**	**MW-116**	**MW-117**	**MW-118**	**MW-119S**
8/7/2003			**6.0**	Well Installed 6/6/06	Well Installed 9/21/06	Well Installed 5/14/07	Well Installed 5/16/07	Well Installed 5/21/07	Well Installed 2/21/08	Well Installed 2/20/08	Well Installed 2/19/08	Well Installed 6/27/11	Well Installed 7/7/11	Well Installed 9/5/13	Well Installed 8/27/13	Well Installed 8/29/13	Well Installed 9/8/13	Well Installed 9/12/13
9/4/2003			3.6															
12/8/2003			4.5															
3/10/2004			2.4															
6/4/2004			4															
9/20/2004			4															
12/8/2004			1.6															
3/29/2005	2.5	<1.0	4.2															
5/23/2005	4.5	<1.0	4.9															
9/12/2005	**17**	<1.0	2.0															
12/19/2005	**8.1**	<1.0	3.0															
3/31/2006	**6.2**	<1.0	4.6															
6/21/2006	**5.5**	<1.0	4.9	<1.0														
8/30/2006	**5.3**	<1.0	3.2	<1.0														
12/12/2006	**5.8**	<1.0	**6.2**	<1.0	**22**													
3/22/2007	4.2	<1.0	**5.1**	0.89	**25**													
6/4/2007	3.8	0.35	4.8	<1.0	**17**	<1.0	<1.0	1.8										
9/18/2007	4.6	<1.0	3.4	<1.0	**40**	<1.0	1.1	2.2										
12/11/2007	3.3	<1.0	3.1	<1.0	**26**	<1.0	<1.0	2.3										
3/17/2008	2.7	<1.0	2.8	<1.0	**26**	<1.0	2.2	2.2	2.1	<1.0	<1.0							
6/2/2008	2.2	<1.0	2.4	<1.0	**25**	<1.0	1.7	1.7	2.3	<1.0	<1.0							
9/10/2008	2.4	<0.5[a]	3.5	<0.5[a]	**20**	<0.5[a]	2.2	1.8	2.3	<0.5[a]	<0.5[a]							
12/9/2008	2.5	<0.50	3.2	<0.50	**18**	<0.50	1.5	1.2	1.8	<0.50	<0.50							
5/29/2010	1		2.5															
6/28/2010		<1.0		<1.0	**9.4**	<1.0	1.3	<1.0	1.3	<1.0	<1.0							
10/20/2010	1.34	0.940	2.64	<0.500	**11.2**	<0.500	1.22	1.08	1.48	<0.500	<0.500							
1/31/2011		1.29	2.20	<0.500	**14.2**													
4/15/2011	1.0	1.4	2.3	<0.500	**14**	<0.500	1.1	0.93	1.2	<0.500	<0.500							
10/14/2011	1.1	1.1	2.4	<0.50	**17**	<0.50	1.4	1.2	1.4	<0.50	<0.50	<0.50	<0.50					
1/26/2012		0.56	1.8	<0.50	**17**													
4/27/2012	0.71	**5.4**	1.4	<0.50	**15**	<0.50	1.2	0.83	0.69	<0.50	<0.50	<0.50	<0.50					
10/12/2012	0.66	<0.50	0.65	<0.50	**16**	<0.50	0.95	0.78	0.54	<0.50	<0.50	<0.50	<0.50					
1/29/2013		<0.50	0.72	<0.50	**15**													
4/19/2013	1.9	<0.50	0.69	<0.50	**11**	<0.50	1.6	0.86	<0.50	<0.50	<0.50	<0.50	<0.50					
7/16/2013		<0.50	0.71	<0.50	**12**													
10/25/2013	4.4	<0.50	0.93	<0.50	**6.7**	<0.50	<0.50	0.76	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	0.81	<0.50	<0.50	<0.50
1/17/2014		<0.50	2.6	<0.50	2.8													<0.50
4/15/2014	**5.7**	<0.50	2.8	<0.50	2.4	<0.50	1.9	1.0	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50
7/17/2014		<0.50	3.7	<0.50	0.93													<0.50
12/12/2014	3.2	<0.50	3.0	<0.50	0.61	<0.50	0.75	1.7	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.44	<0.50	<0.50	<0.50

TABLE 10
Historic PCE and TCE Concentrations in Off-Site Monitoring Wells
Cooper and Commerce WQARF Site

Date	TCE Concentrations (µg/L)																	
	G-9	G-10	MW-104S	MW-105	MW-106	MW-107	MW-108	MW-109	MW-110	MW-111	MW-112	MW-113	MW-114	MW-115	MW-116	MW-117	MW-118	MW-119S
2/26/2015	3.2	<0.50	3.5	<0.50	<0.50	<0.50	1.1	2.0	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.82	**7.6**	<0.50	<0.50

Notes:

PCE = Tetrachloroethene
TCE = Trichloroethene
µg/L = Micrograms per liter
[a] = Reporting level for PCE and TCE was 1.0 µg/L prior to 9/08 and 0.5 µg/L after 9/08

The Aquifer Water Quality Standard (AWQS) for both PCE and TCE is 5 µg/L. PCE and TCE concentrations greater than the AWQS are in ***bold.***
G-10 sample for 4/27/12 event was obtained with a bailer because the dedicated pump was not operable.

TABLE 11
Summary of Aquifer Test Results

Short-term Pump Test

Well	T (ft^2/day)	S	K_v (ft/day)	c	n	b (ft)
EW-1	200,000	0.025	1.0	4.30E-05	2.9	135
MW-101	208,000	0.019	0.80	n/a	n/a	135
MW-102	159,000	0.0049	2.75	n/a	n/a	135
MW-103	260,000	0.065	0.003	n/a	n/a	135

24-Hour Pump Test

Well	T (ft^2/day)	S	Sy	Kv/Kr	b (ft)
MW-101	109,700	0.03986	0.1443	2.89E-05	85
MW-102	100,100	0.01204	0.03147	7.39E-06	85
MW-103	100,100	0.07954	0.09338	6.55E-06	85

Notes:

T = Transmissivity
S = Storage coefficient
Sy = Specific Yield
K_V = Vertical hydraulic conductivity
K_r = horizontal hydraulic conductivity
b = Assumed aquifer thickness
c = Well loss constant
n = Well loss exponent

TABLE 12
Effluent Flow Summary
Cooper and Commerce WQARF Site

Date	PERIOD FLOW (gallons)	MONTHLY FLOWS (gallons)	AVERAGE FLOW RATE (MGD)	MAXIMUM FLOW RATE (MGD)	CUMULATIVE DISCHARGES (gallons)	COMMENTS
System Start-up (from field notes)						
8/1/10	0	0			0	
8/31/10	878,380	878,380			878,380	
9/17/10	2,459,359					
System Operation (from data logger)						
9/17/10	0					
9/30/10	1,972,289	4,431,648	0.146	0.151	5,310,027	
10/31/10	4,181,607	4,181,607	0.136	0.146	9,491,634	
11/30/10	4,553,615	4,553,615	0.151	0.179	14,045,249	
12/31/10	4,563,573	4,563,573	0.138	0.154	18,609,084	
1/31/11	762,656	762,656	0.019	0.152	19,371,740	WTP shutdown 1-5-11
2/28/11	2,206,813	2,206,813	0.081	0.169	21,578,553	WTP startup 2-15-11
3/31/11	4,995,072	4,995,072	0.162	0.165	26,573,625	
4/30/11	4,348,377	4,348,377	0.151	0.165	30,922,002	
5/31/11	4,649,976	4,649,976	0.155	0.158	35,571,978	
6/30/11	3,608,873	3,608,873	0.117	0.154	39,180,850	WTP shutdown 6-24-11
7/31/11	1,591,857	1,591,857	0.053	0.172	40,772,707	WTP startup 7-22-11
8/31/11	5,140,844	5,140,844	0.166	0.168	45,913,551	
9/30/11	4,545,625	4,545,625	0.151	0.161	50,459,176	
10/31/11	4,083,568	4,083,568	0.132	0.138	54,542,744	
11/30/11	62,485	62,485	0.004	0.126	54,605,229	WTP shutdown 11-1-11
12/31/11	0	0	0.000	0.000	54,605,229	WTP still shut down as of 12-31-11
1/31/12	0	0	0.000	0.000	54,605,229	WTP still shut down as of 1-31-12
2/29/12	0	0	0.000	0.000	54,605,229	WTP still shut down as of 2-29-12
3/31/12	5,949,262	5,949,262	0.196	0.201	60,554,491	WTP startup 3-1-2012
4/30/12	5,744,797	5,744,797	0.191	0.194	66,299,288	
5/31/12	5,436,797	5,436,797	0.181	0.188	71,736,085	
6/30/12	5,612,245	5,612,245	0.189	0.197	77,348,329	
7/31/12	2,673,518	2,673,518	0.088	0.196	80,021,847	System down 7-14-12; needs repair
8/31/12	870,577	870,577	0.038	0.202	80,892,424	System restarted 8-27-12
9/30/12	5,827,001	5,827,001	0.194	0.197	86,719,426	
10/31/12	3,216,735	3,216,735	0.111	0.196	89,936,161	System down 10-15-12, needs repair
11/30/12	5,027,533	5,027,533	0.172	0.194	94,963,693	System restarted 10-29-12
12/31/12	1,814,358	1,814,358	0.062	0.176	96,778,051	Sys shut down 12/11/12 breakthrough
1/31/13	1,080,423	1,080,423	0.045	0.180	97,858,474	N Vessel carbon change 1-22-13
2/28/13	4,851,926	4,851,926	0.174	0.182	102,710,399	
3/31/13	5,326,701	5,326,701	0.171	0.180	108,037,100	

TABLE 12
Effluent Flow Summary
Cooper and Commerce WQARF Site

Date	PERIOD FLOW (gallons)	MONTHLY FLOWS (gallons)	AVERAGE FLOW RATE (MGD)	MAXIMUM FLOW RATE (MGD)	CUMULATIVE DISCHARGES (gallons)	COMMENTS
4/30/13	5,085,837	5,085,837	0.170	0.176	113,122,937	
5/31/13	5,312,440	5,312,440	0.172	0.215	118,435,377	
6/30/13	2,159,992	2,159,992	0.170	0.175	120,595,369	Sys shut down 6/11/13 breakthrough
7/31/13	5,234,531	5,234,531	0.169	0.170	125,829,900	S Vessel carbon change 6-20-13
8/31/13	5,227,094	5,227,094	0.169	0.202	131,056,994	
9/30/13	5,350,066	5,350,066	0.179	0.182	136,407,060	
10/31/13	5,380,897	5,380,897	0.178	0.181	141,787,956	
11/30/13	4,458,399	4,458,399	0.153	0.178	146,246,355	
12/31/13	5,554,993	5,554,993	0.181	0.188	151,801,348	
1/31/14	5,610,607	5,610,607	0.182	0.184	157,411,955	System shut down 1/31/14 breakthrough
2/28/14	2,383,612	2,383,612	0.167	0.172	159,764,741	N Vessel carbon change 2-14-14
3/31/14	4,442,217	4,442,217	0.168	0.171	164,206,958	
4/30/14	4,903,023	4,903,023	0.163	0.168	169,109,981	
5/31/14	4,980,956	4,980,956	0.158	0.167	174,090,937	
6/30/14	3,245,917	3,245,917	0.160	0.165	177,336,854	S Vessel carbon change 6-20-14
7/31/14	5,216,242	5,216,242	0.169	0.187	182,553,096	
8/31/14	5,230,211	5,230,211	0.169	0.181	187,783,307	
9/30/14	5,224,034	5,224,034	0.177	0.181	193,007,341	System Shut Down; Power Off By APS

Notes:
MGD = millions of gallons per day

TABLE 13
Soil Geotechnical Properties
Cooper and Commerce WQARF Site

Boring	Depth (ft bls)	Wet Weight (g)	Dry Weight (g)	Gravimetric Moisture Content (% by weight)	Dry Density (lbs/ft^3)	Porosity
VP-101	10	253.1	216.7	16.8	95.8	0.42
VP-101	20	223.6	190.4	17.4	97.1	0.41
VP-101	30	228.8	178.1	28.5	95.9	0.42
VP-101	50	216.1	168.4	28.3	93.6	0.43

Notes: *ft bls = Feet below land surface*
g = Grams
lbs/ft^3 = Pounds per cubic foot

TABLE 14
Water Supply Wells in the Site Vicinity

ADWR 55 ID Number	Other Identifier	Cadastral ID	Well Type	Well Use	Water Use	Casing Depth (feet bgs)	Pump Rate (gpm)	UTM Easting (m)	UTM Northing (m)	Owner
Exempt Withdrawal Wells Within One Mile of the Site Plumes										
635924		D01005012BCB	Exempt	Production	Domestic	400	30	425010.30	3691475.00	Hunter Ditch Lining
636811		D01005002DAA	Exempt	Production	Domestic	NA	NA	424812.10	3692686.00	Eldon Cooley
636808		D01005011AAB	Exempt	Production	Domestic	NA	NA	424607.80	3691879.00	EW Cooley
634676		D01005014ABA	Exempt	Production	Domestic	276	NA	424405.90	3690269.00	LM Pace
504100	G-1	D01005012CAC	Exempt	Observation	Observation	242	30	425417.30	3690870.00	Maricopa Association of Governments
504101	G-2	D01005012CAC	Exempt	Observation and Monitoring	Observation	232	30	425417.30	3690870.00	Maricopa Association of Governments
504666	G-5	D01005002CBD	Exempt	Observation	Monitoring	244	30	424201.15	3692525.68	Maricopa Association of Governments
Non-Exempt Withdrawal Wells Within One Mile of the Site Plumes										
211538	EW-101	D01005012BDC	Non-Exempt	Hydro Test Permit	Test	190	110	425415.50	3691272.00	ADEQ
595204	R-1	D01005011BCD	Non-Exempt	Primary: Production Secondary: Recovery	Recreation and Municipal	295	NA	423601.60	3691280.00	Town of Gilbert
534889	TOG 14	D01005012DBA	Non-Exempt	Production	Municipal	880	1800	426022.60	3691070.00	Town of Gilbert
541861	former TOG 15	D01005002DBB	Non-Exempt	Production	Municipal	1000	1500	424202.10	3692685.00	Town of Gilbert
539954	G-10	D01005012CBA	Non-Exempt	Primary: Production and monitoring Secondary: Recovery	Municipal and Monitoring	226	200	425214.40	3691072.00	Town of Gilbert
524081	G-7	D01005012CAA	Non-Exempt	Primary: Production and monitoring Secondary: Recovery	Recreation, Monitoring, and Municipal	250	50	425618.50	3691071.00	Town of Gilbert
524082	G-8	D01005012CAA	Non-Exempt	Primary: Production and monitoring Secondary: Recovery	Recreation, Monitoring, and Municipal	250	50	425618.50	3691071.00	Town of Gilbert
617104	SRP 29E-2.0S	D01005012CCC	Non-Exempt	Primary: Production Secondary: Recovery	Irrigation and Municipal	400	3489	425013.50	3690468.00	Salt River Project
617105	SRP 29E-1.5S	D01005012CBB	Non-Exempt	Primary: Production Secondary: Recovery	Recreation and Municipal	364	2114	425011.00	3691072.00	Salt River Project
542431	SRP 29E-1.0S TOG 15	D01005011AAA	Non-Exempt	Primary: Production Secondary: Recovery	Municipal and Irrigation	710	2737	424808.60	3691878.00	Salt River Project Town of Gilbert

Notes:

ADWR = Arizona Department of Water Resources
bgs = Below Ground Surface
gpm = Gallons Per Minute
m = meter
NA = Not Available

TABLE 15
Toxicity Values

Chemical	**SFO (mg/kg-day)$^{-1}$**	**SFO Ref**	**IUR (ug/m3)$^{-1}$**	**IUR Ref**	**RfD (mg/kg-day)**	**RfD Ref**	**RfC (mg/m^3)**	**RfC Ref**
Tetrachloroethene	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I
Trichloroethene	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I

Notes:

SFO = Oral cancer slope factor

IUR = Inhalation unit risk

RfD = Oral reference dose

RfC = Inhalation reference concentration

Ref: I = IRIS; X = PPRTV Appendix; P = PPRTV

PPRTV = Provisional Peer-Reviewd Toxicity Value

TABLE 16
Cancer Risk and Health Hazard for Tap Water at the Site

Cancer Risk

Chemical	Concentration (µg/L)	Ingestion	Dermal	Inhalation	Total
Tetrachloroethene	59	1.84E-06	1.06E-06	3.15E-06	6.06E-06
Trichloroethene	15	3.20E-05	4.74E-06	3.20E-05	6.88E-05
Cumulative Risk		3.39E-05	5.81E-06	3.52E-05	7.49E-05

Non-Cancer Hazard (Child)

Chemical	Concentration (µg/L)	Ingestion	Dermal	Inhalation	Total
Tetrachloroethene	59	0.629	0.362	0.707	1.7
Trichloroethene	15	1.92	0.307	3.6	5.82
Harzard Index		2.55	0.669	4.3	7.52

Non-Cancer Hazard (Adult)

Chemical	Concentration (µg/L)	Ingestion	Dermal	Inhalation	Total
Tetrachloroethene	59	0.269	0.161	0.707	1.14
Trichloroethene	15	0.822	0.137	3.6	4.55
Hazard Index		1.09	0.298	4.3	5.69

Notes:

µg/L = micrograms per liter

TABLE 17
Cancer Risk and Health Hazard for PCE in Indoor Air at the Site

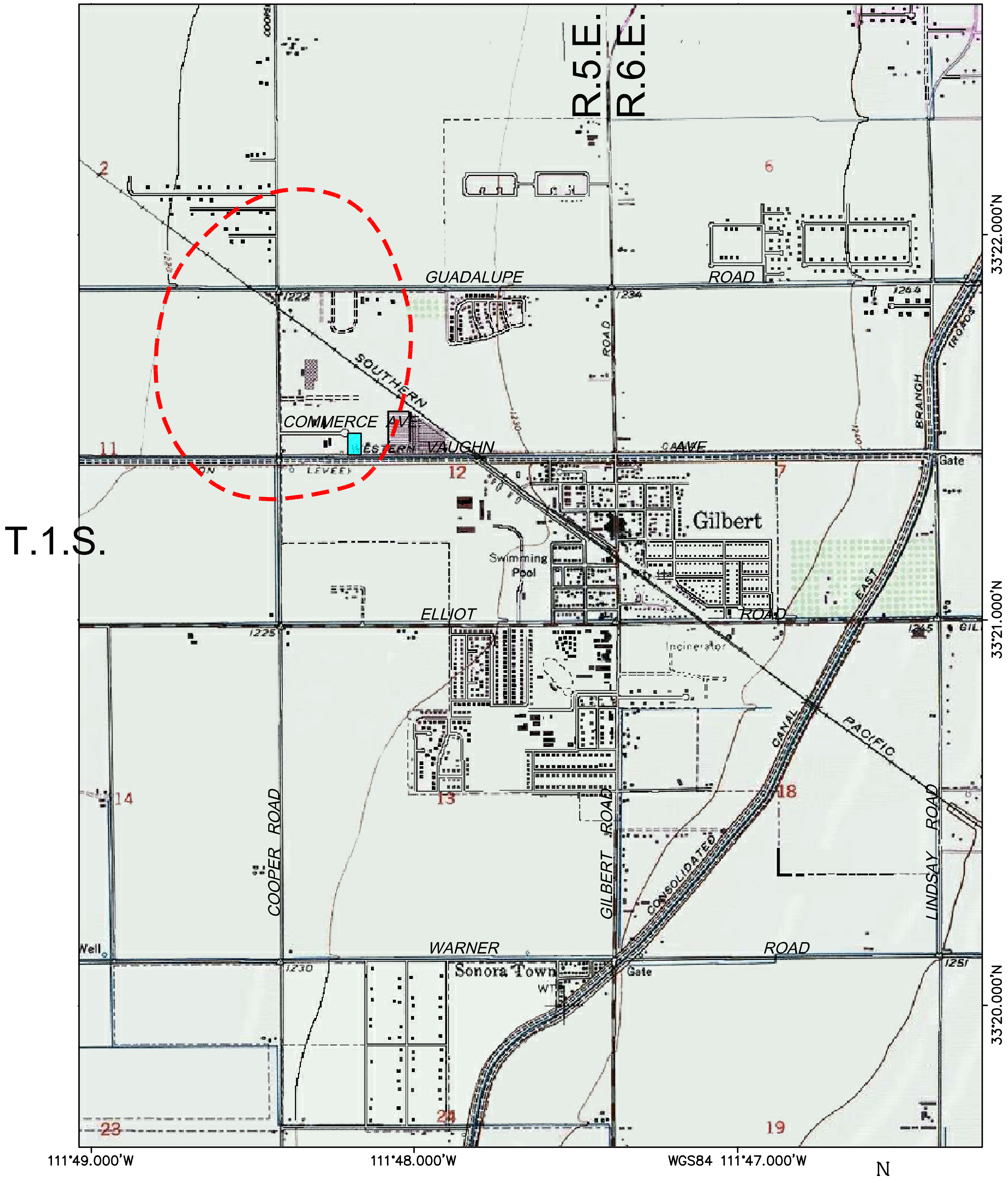
Location	Soil Vapor Concentration µg/m^3	AF	Indoor Air Concentration µg/m^3	Cancer Risk	Hazard Quotient
SS-4@1'	3800	0.02	76	1.61E-06	0.434
SS-15@5'	9800000	0.02	196000	4.16E-03	1120
MW-117@10'	72.7	0.02	1.45	3.07E-08	0.00828

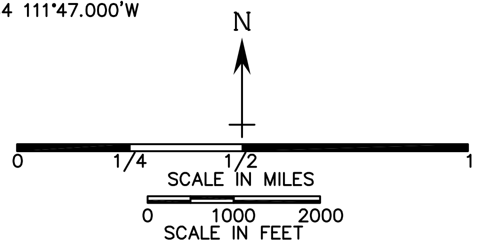
Notes:

AF = Attenuation factor

µg/m^3 = micrograms per cubic meter

FIGURES





EXPLANATION:

◯ WQARF SITE BOUNDARY

🟦 FORMER UNICHEM FACILITY

HYDRO
GEO
CHEM, INC.

SITE LOCATION MAP
COOPER AND COMMERCE
WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/14/12	JAA	12/14/12	2010002046A	1

K:\2010002 CooperCommerce\PDFs\2010002046A

Legend

✚	Monitor Well
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well
●	Well With Dedicated Pump (Currently Pumping)
—	Cross Section View
◌	WQARF Site Boundary
▨	Former Unichem Facility

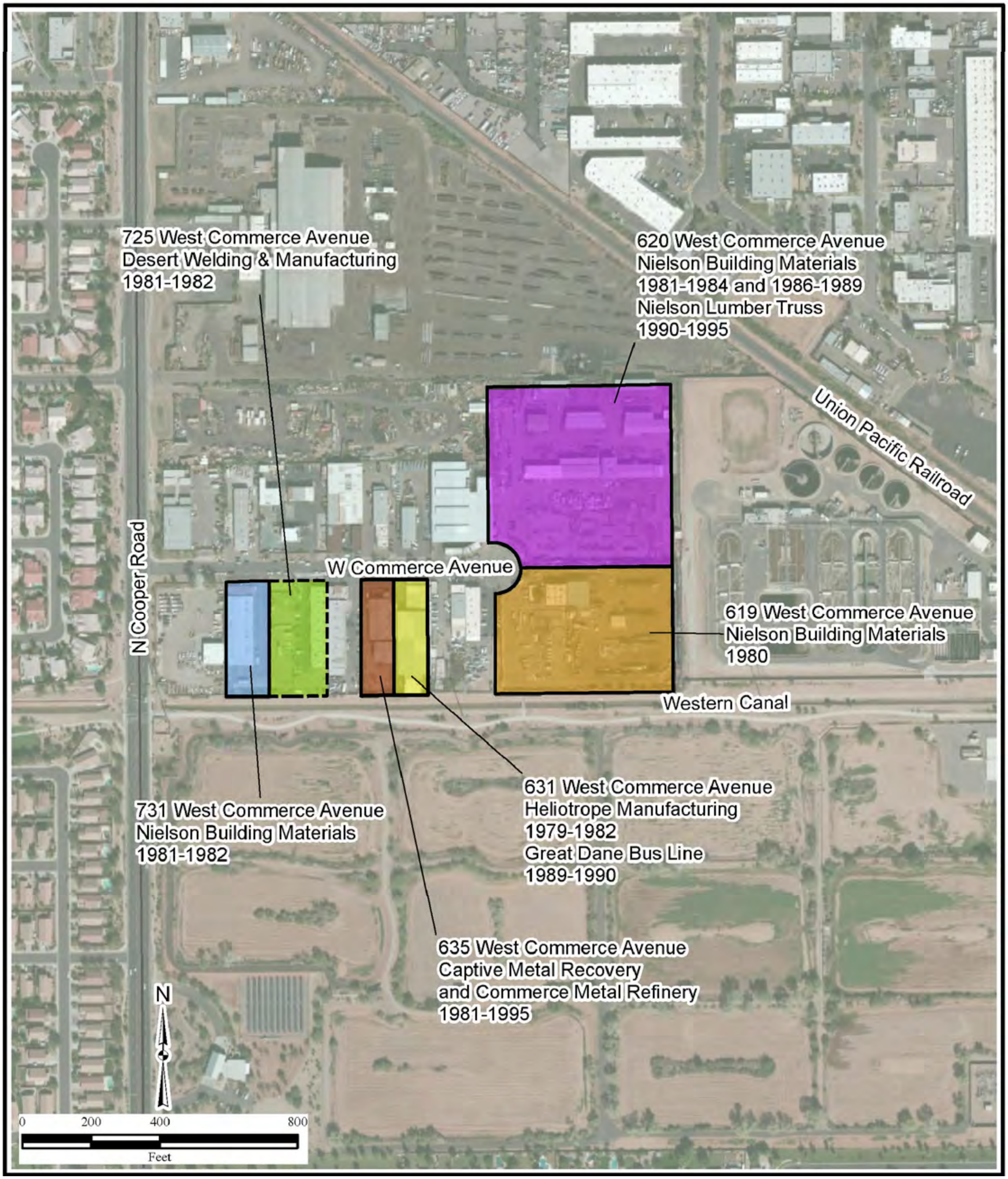
N

0 600 1,200
SCALE IN FEET

HYDRO GEO CHEM, INC.

MONITORING WELL LOCATION PLAN
COOPER AND COMMERCE WQARF SITE
GILBERT, ARIZONA

Approved	Date	Author	Revised	File Name	Figure
MJB	3/13/14	JAA	5/1/14	2010002082A	2



Source: HydroGeologic, Inc. Report Dated February 4, 2014

Imagery: ADEQ, Arizona Department of Transporation

ArcGIS Online Imagery

Legend

▭ **Property Boundary**
(colored to differentiate)
(dashed where estimated)

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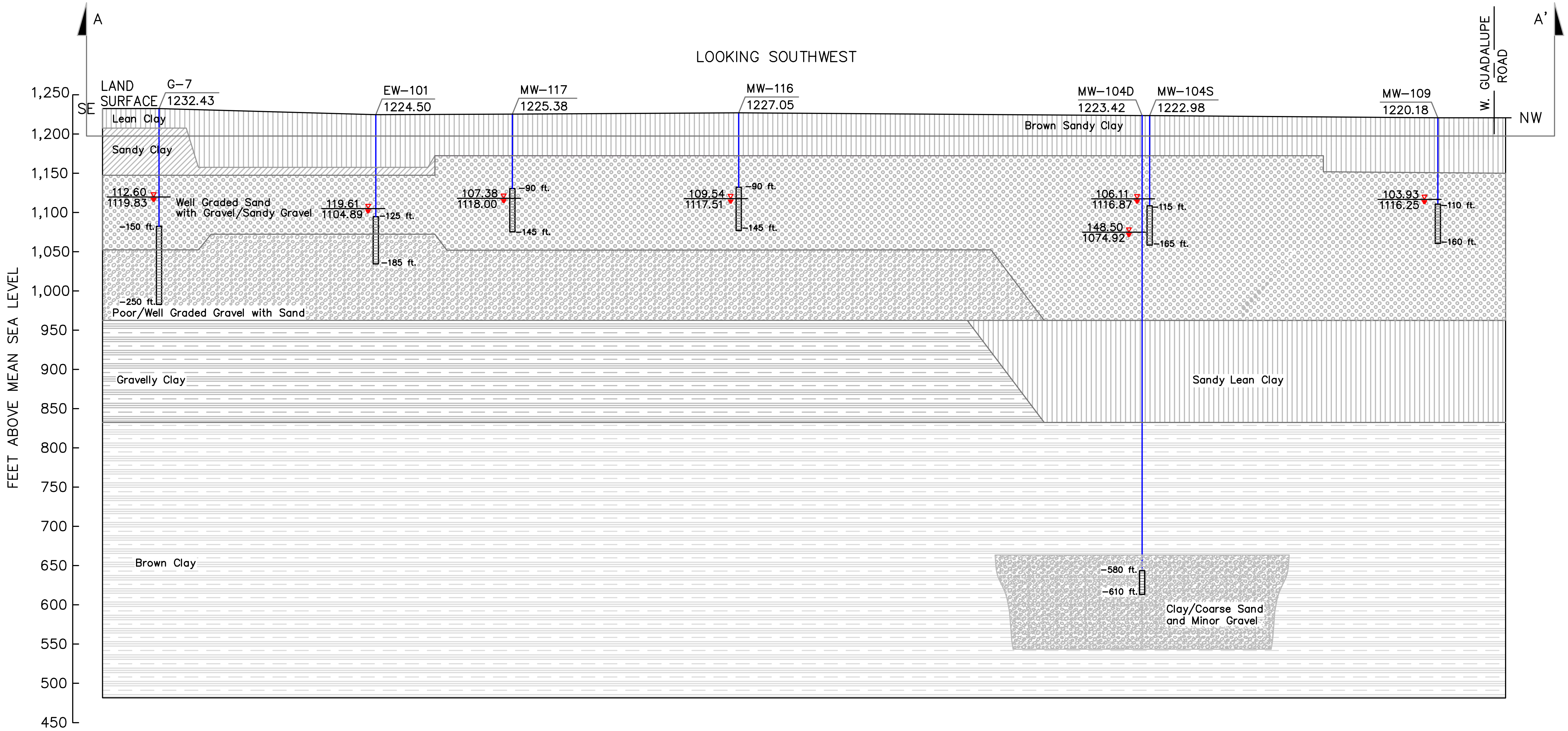
CHEM, INC.

HISTORICAL BUSINESS OPERATIONS
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
MJB	3/14/14	JAA	3/14/14	2010002083A	3



LEGEND

-180 ft. ▯ -200 ft.	MONITOR WELL SCREEN INTERVAL
MW-117 / 1225.38	MONITOR WELL IDENTIFICATION NUMBER MEASURING POINT ELEVATION
-200 ft.	SCREEN DEPTH
107.38 ▼ 1118.00	DEPTH TO GROUNDWATER GROUNDWATER ELEVATION
DRY	WELL DRY
NA	NOT APPLICABLE

NOTE WATER LEVELS WERE COLLECTED FOR ALL WELLS APRIL, 2014, WITH THE EXCEPTION OF EW-101 WHICH WAS COLLECTED IN MAY, 2014. CROSS SECTION LOCATION SHOWN ON FIGURE 2.

APPROXIMATE SCALE
Measured In Feet
Horizontal Scale
0 140 280

APPROXIMATE SCALE
Measured In Feet
Vertical Scale
0 70 140

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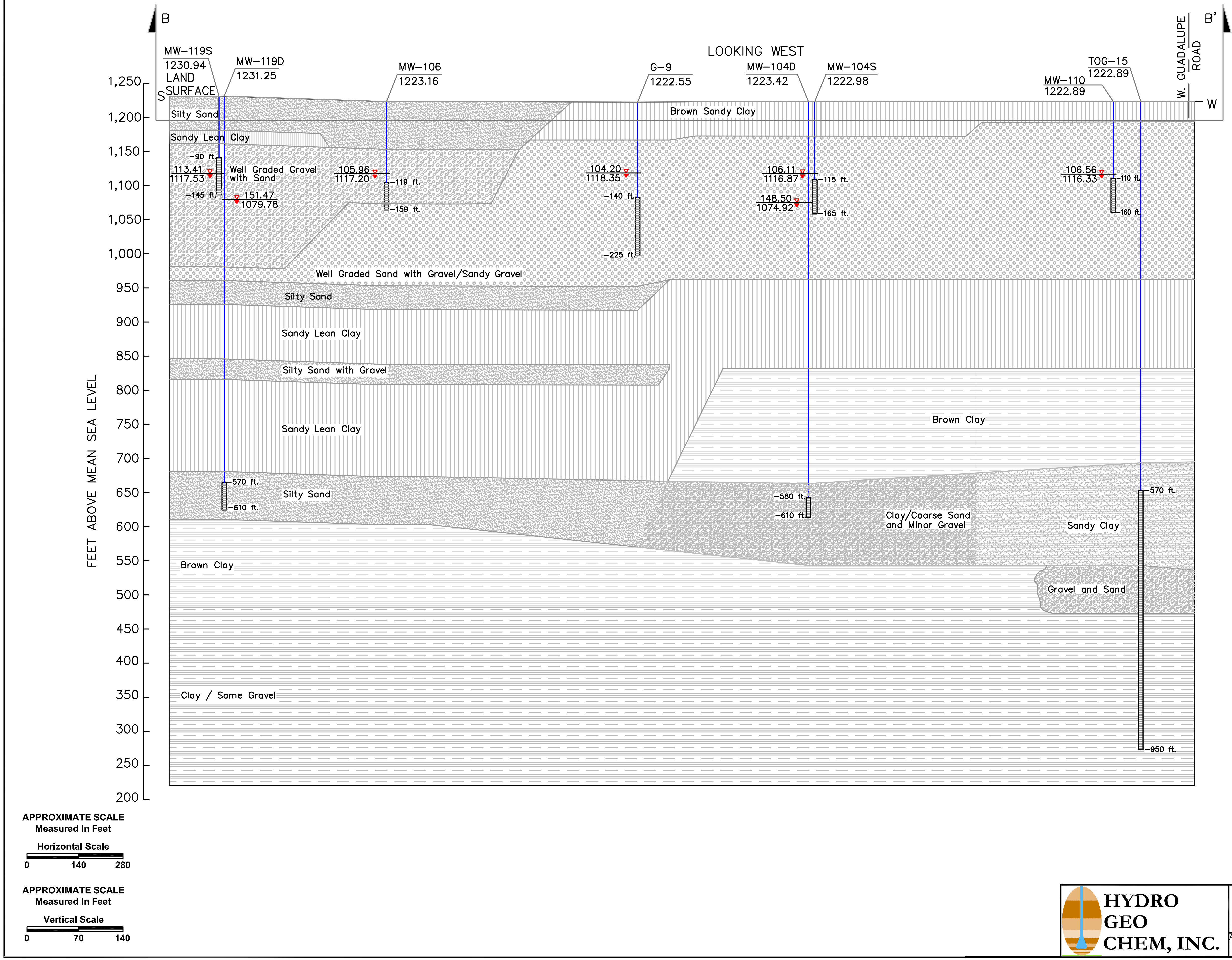
SOUTHEAST-NORTHWEST CROSS SECTION A-A'
MONITORING WELL NETWORK
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
MJB	9/23/14	JAA	9/23/14	2010002088A	4



LEGEND

–180 ft. ▯ –200 ft.	MONITOR WELL SCREEN INTERVAL
MW–117 / 1225.38	MONITOR WELL IDENTIFICATION NUMBER MEASURING POINT ELEVATION
–200 ft.	SCREEN DEPTH
▽ 107.38 / 1118.00	DEPTH TO GROUNDWATER GROUNDWATER ELEVATION
DRY	WELL DRY
NA	NOT APPLICABLE

NOTE WATER LEVELS WERE COLLECTED FOR ALL WELLS APRIL, 2014. CROSS SECTION LOCATION SHOWN ON FIGURE 2.

HYDRO
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SOUTH-NORTH CROSS SECTION B-B'
MONITORING WELL NETWORK
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
MJB	9/23/14	JAA	9/23/14	2010002088A	5

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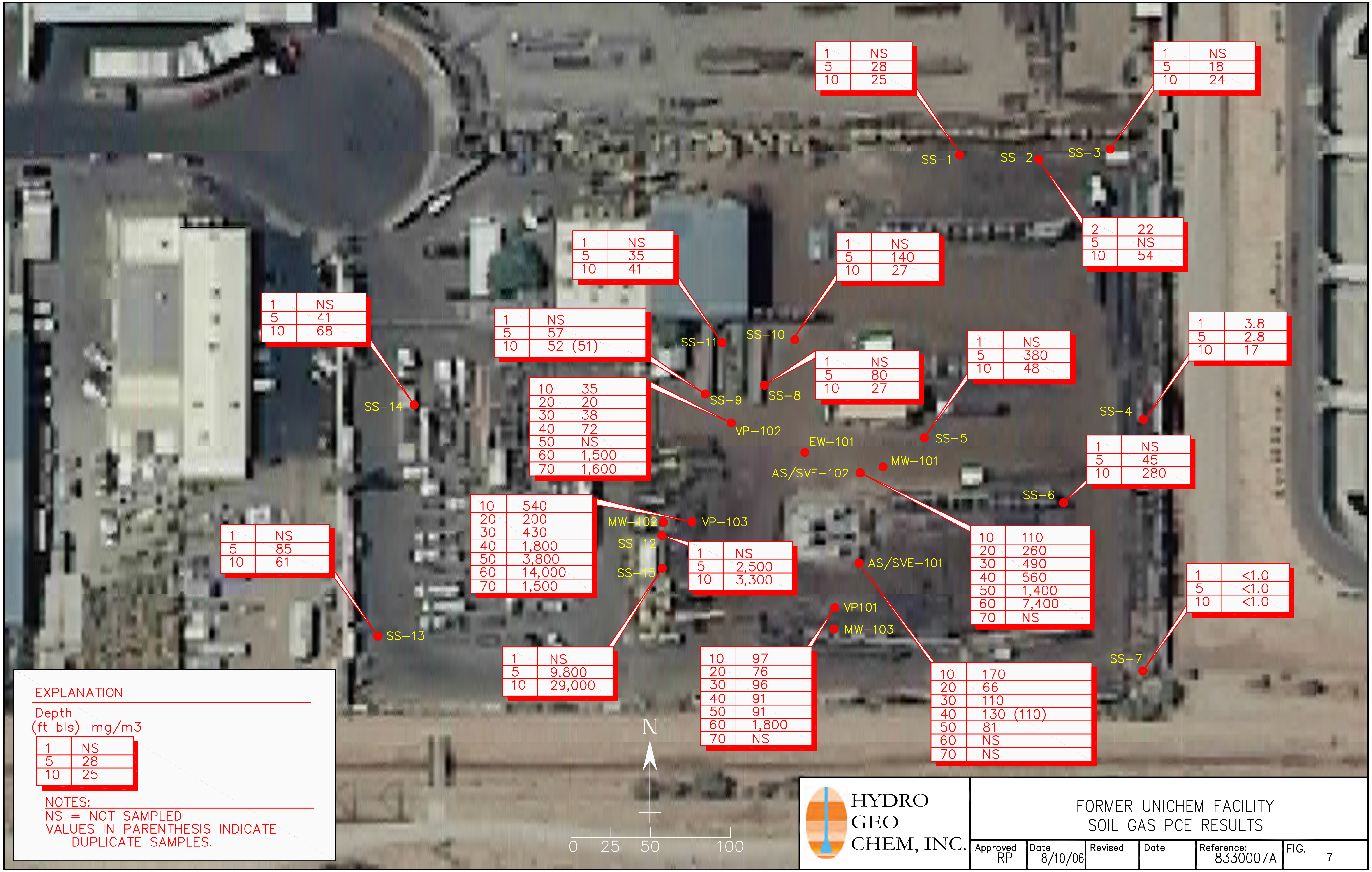
FORMER UNICHEM FACILITY
SOIL BORING LOCATIONS

Approved	Date	Revised	Date	Reference:	FIG.
RP	8/10/08	JAA	5/5/14	8330008A	6



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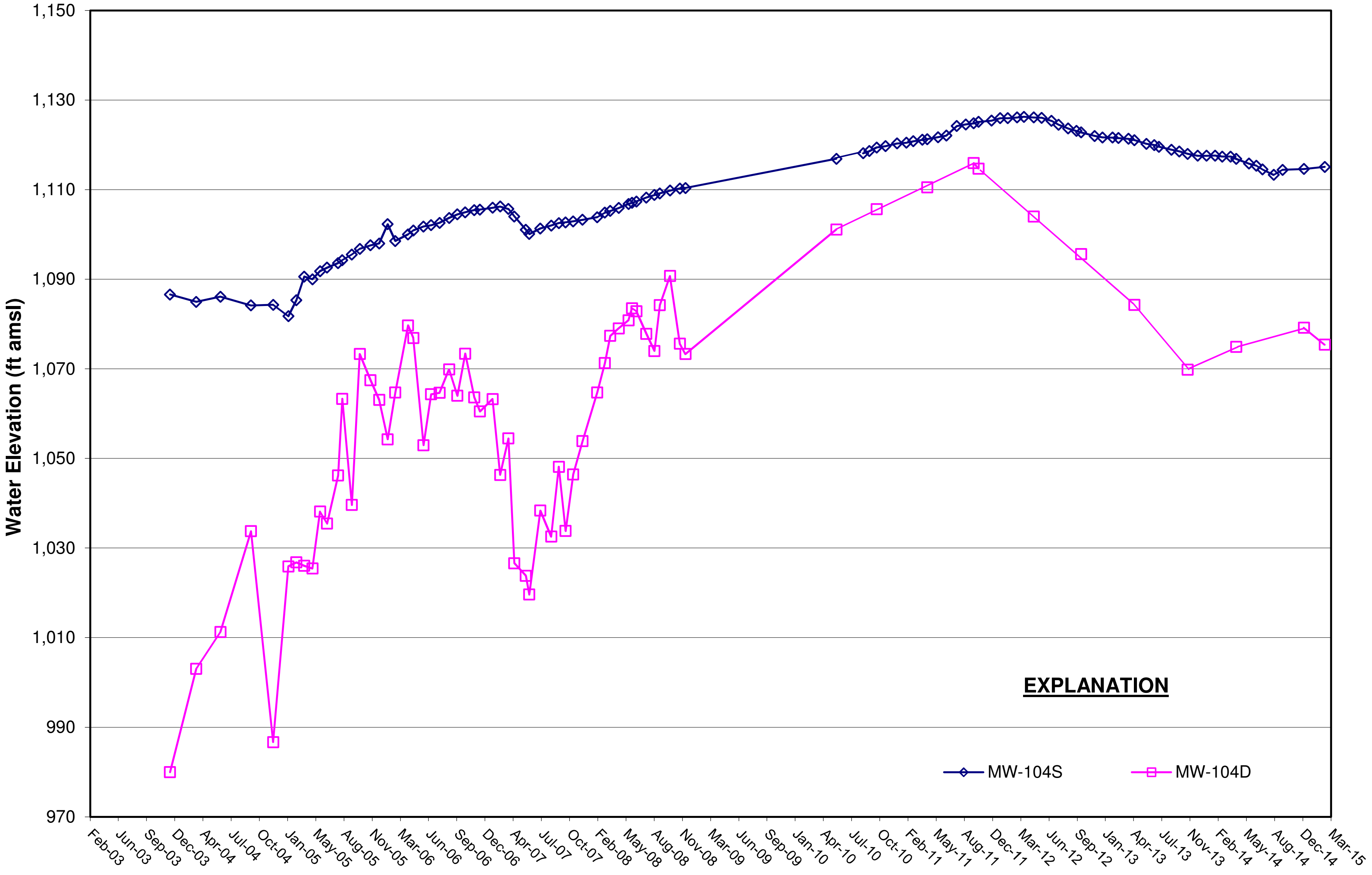
FORMER UNICHEM FACILITY
SOIL GAS PCE RESULTS

Approved	Date	Revised	Date	Reference:	FIG.
RP	8/10/06			8330007A	7



Notes:
Wells re-surveyed July, 2011
MW-104S Measuring Point Elevation Difference = +1.88 feet
MW-104D Measuring Point Elevation Difference = +1.84 feet

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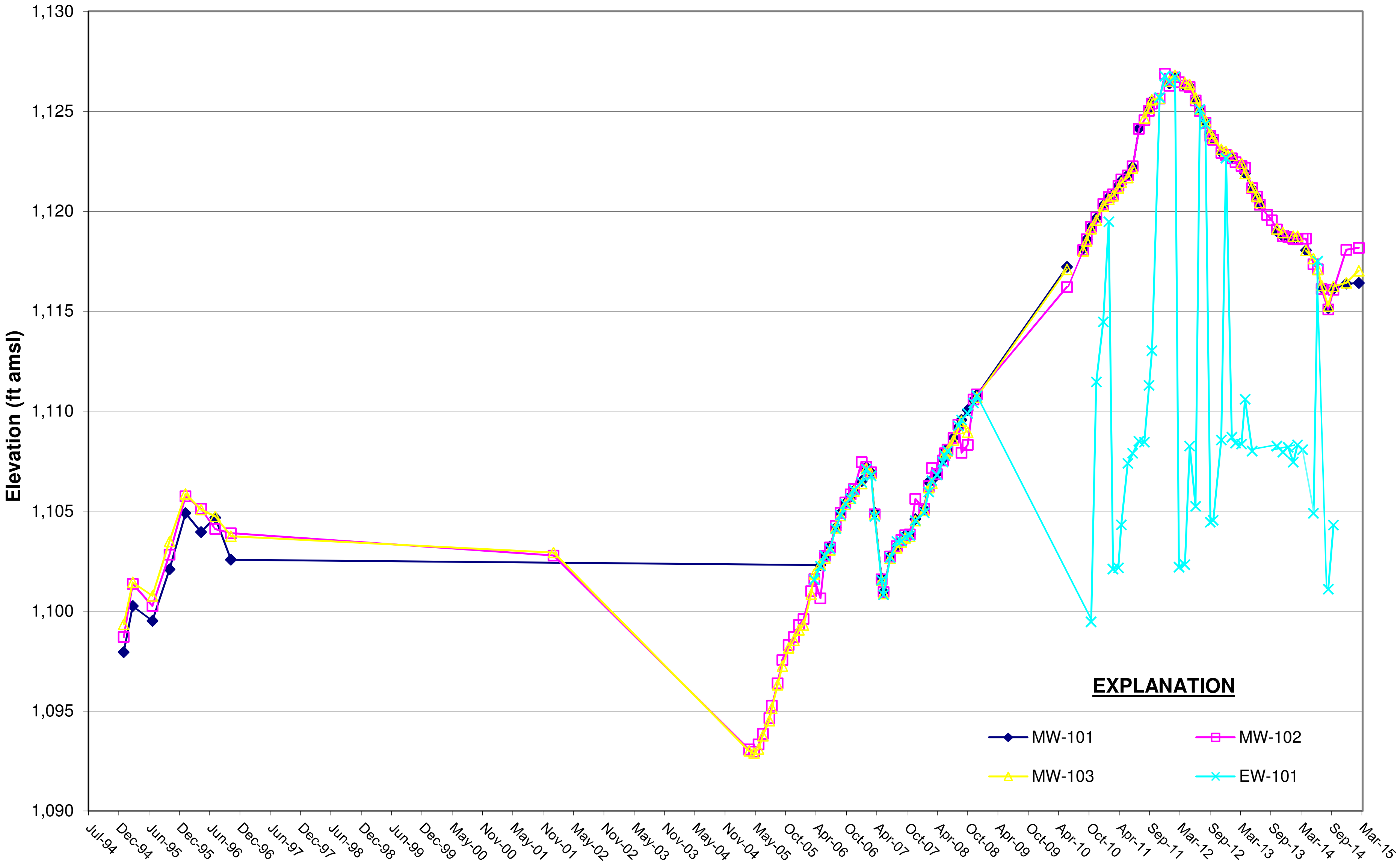
Hydrographs For
MW-104S and MW-104D

APPROVED	DATE	FIGURE
FJS	4/30/15	**8**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls: Fig 8



Notes:
Wells re-surveyed July, 2011
MW-101 Measuring Point Elevation Difference = +1.99 feet
MW-102 Measuring Point Elevation Difference = +3.45 feet
MW-103 Measuring Point Elevation Difference = +2.33 feet
EW-101 Measuring Point Elevation Difference = +3.04 feet

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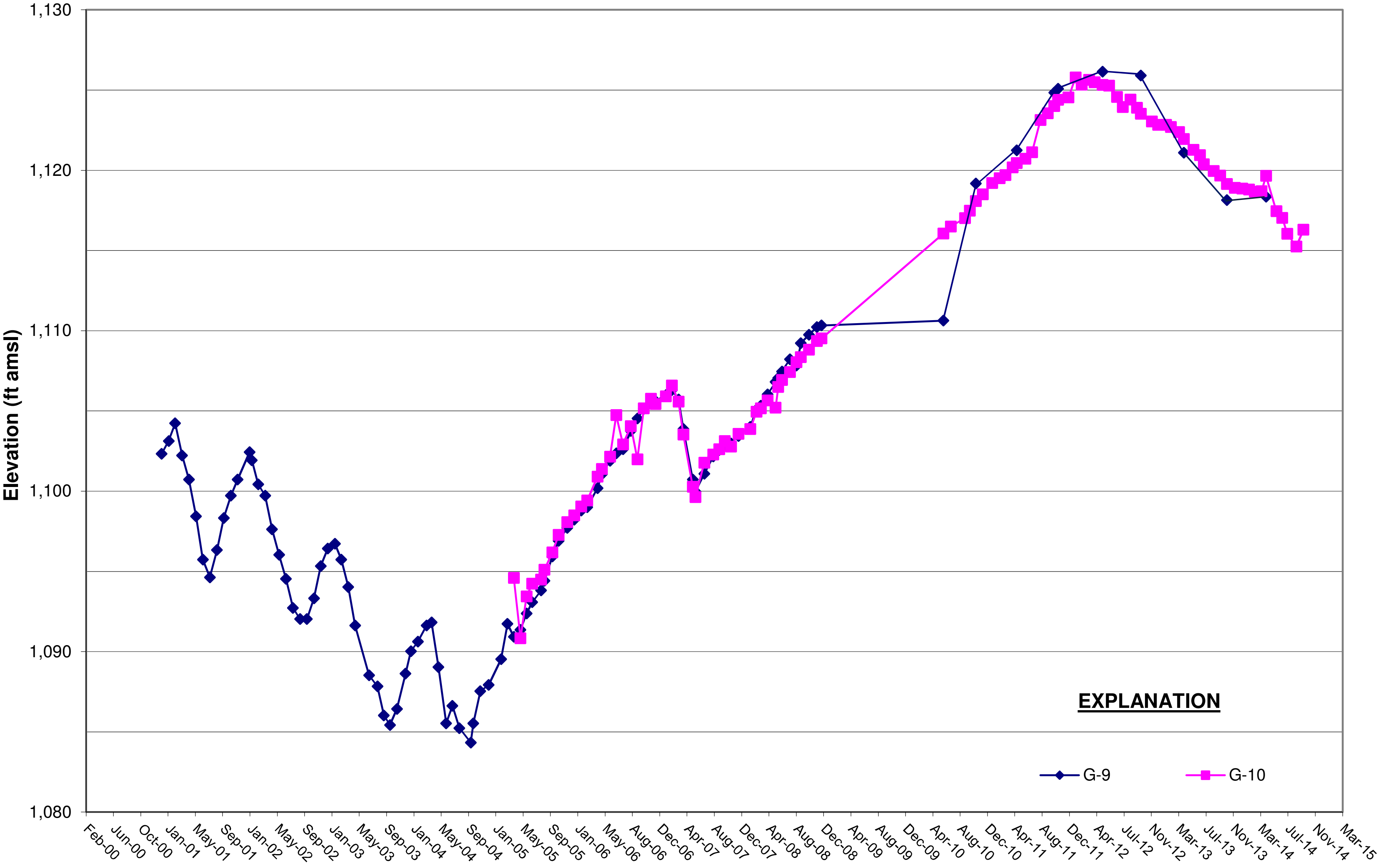
Hydrographs For On-Site Shallow Monitoring Wells
MW-101 Through MW-103 and EW-101

APPROVED	DATE	FIGURE
FJS	4/30/15	**9**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls



Notes:
Wells re-surveyed July, 2011
G-9 Measuring Point Elevation Difference = +1.92 feet
G-10 Measuring Point Elevation Difference = +1.85 feet

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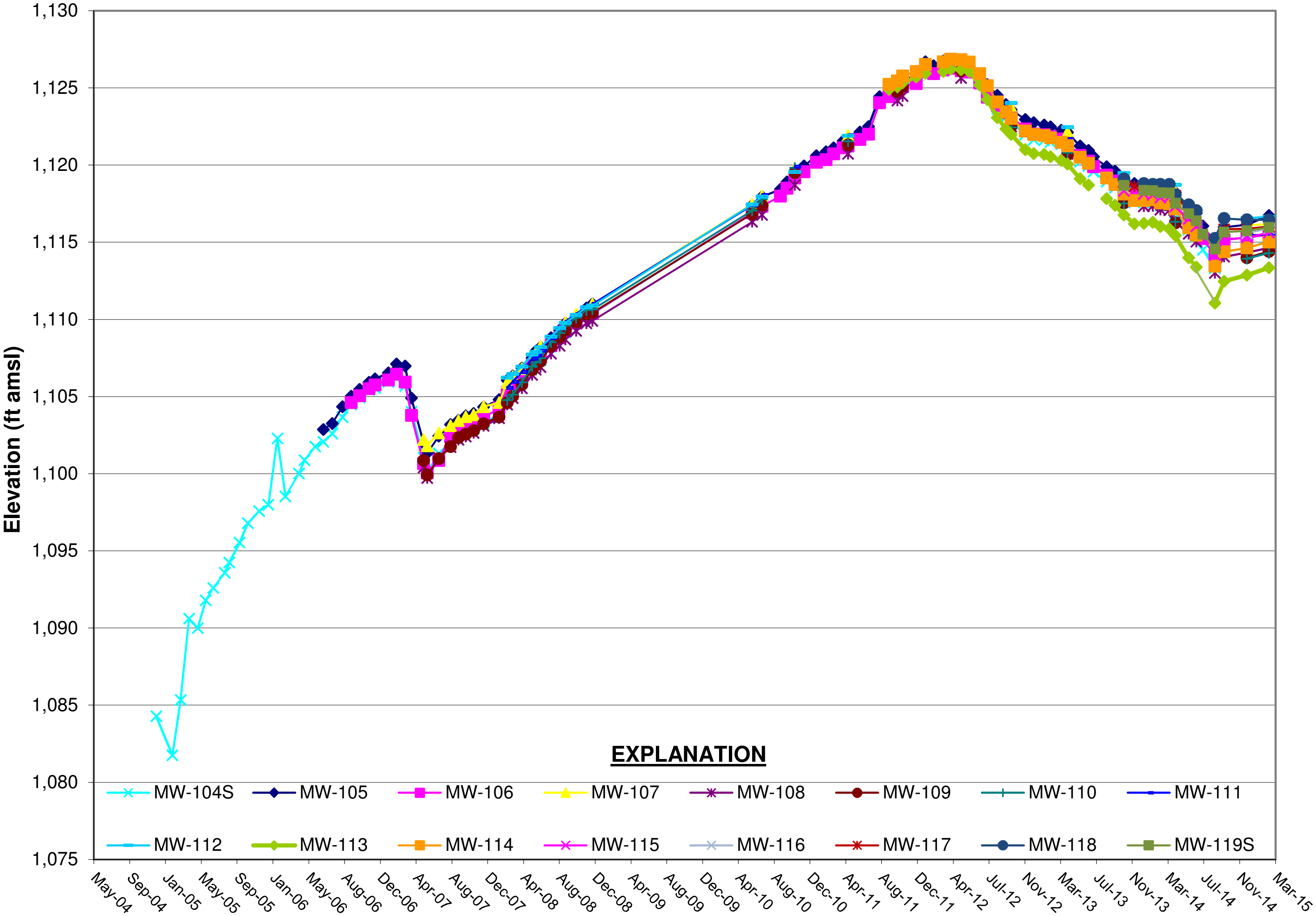
Hydrographs For
G-9 and G-10

APPROVED	FJS	DATE	4/30/15	FIGURE	**10**



Notes:

Wells re-surveyed July, 2011

Measuring Point Elevation Differences listed below:

MW-104S = +1.88 feet
MW-106 = +1.80 feet
MW-108 = +1.84 feet
MW-110 = +1.80 feet
MW-112 = +1.81 feet
MW-114 = NA

MW-105 = +1.75 feet
MW-107 = +1.82 feet
MW-109 = +1.88 feet
MW-111 = +1.79 feet
MW-113 = NA

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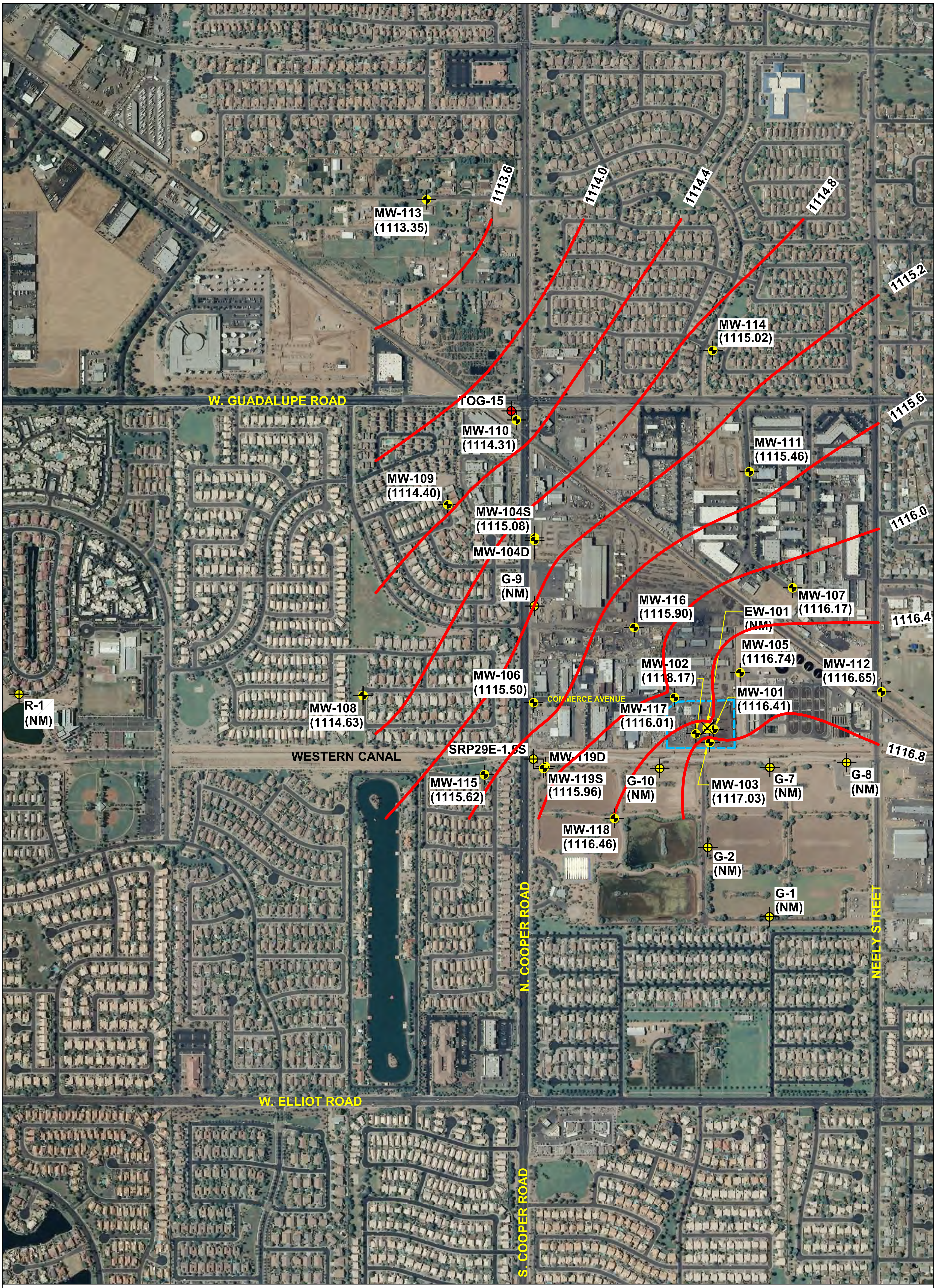
Hydrographs For Off-Site Shallow Monitoring Wells MW-104S Through MW-119S

APPROVED	DATE	FIGURE
FJS	4/30/15	11



Legend

MW-101 (1116.41)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Not Operating at Time of Measurement)
●	Well With Dedicated Pump (Currently Pumping)
━	Groundwater Contour (ft amsl)
(NM)	Not Measured
⬚	Facility Boundary

N

0 700
SCALE IN FEET

Note: Wells G-1, G-2, G-7, G-8, G-9, G-10, EW-101, MW-104D and MW-119D not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken February 23, 2015
by Geosyntec Consultants.

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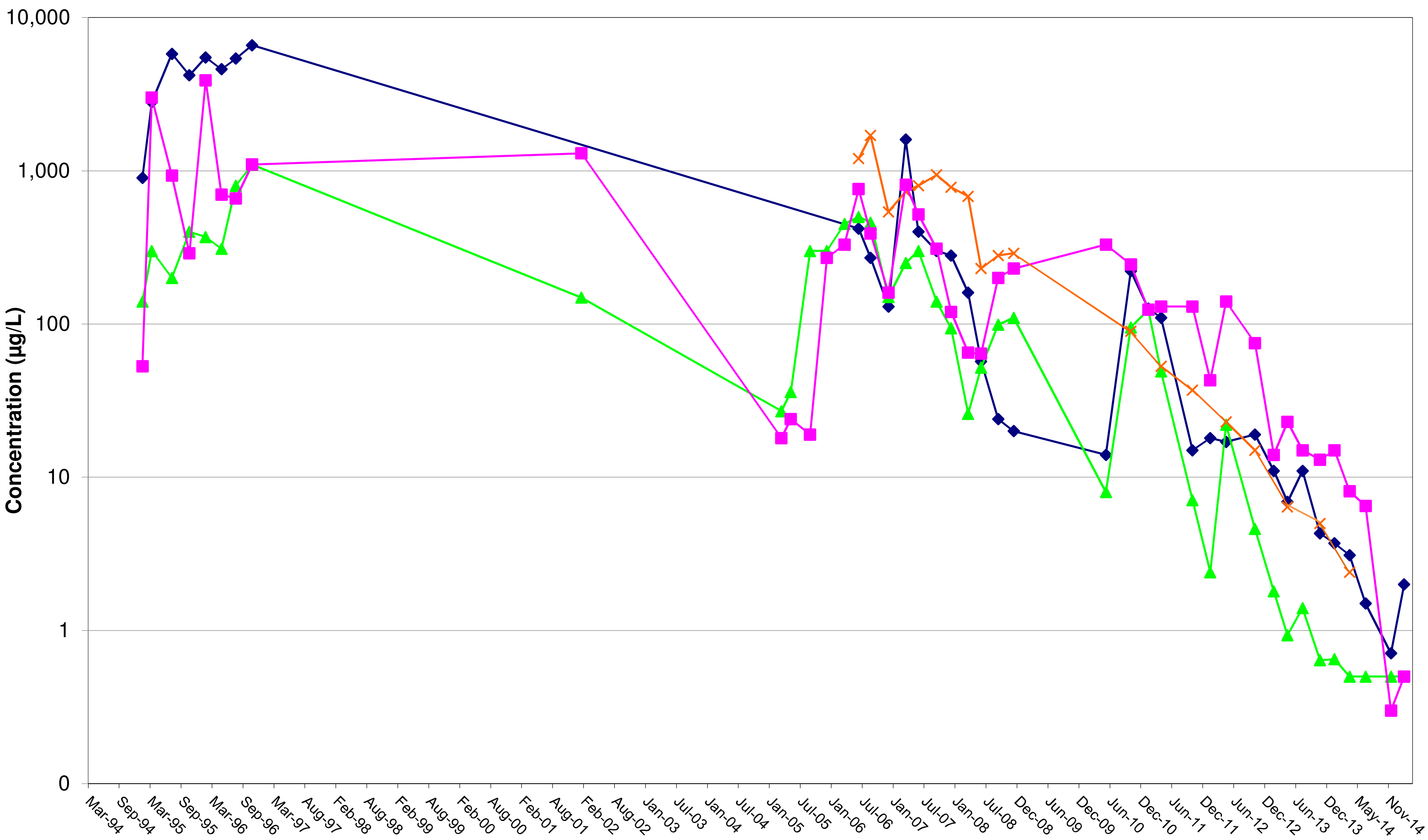
GROUNDWATER ELEVATIONS
FEBRUARY 2015
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	6/11/15	JAA	6/11/15	2010002095A	12



EXPLANATION

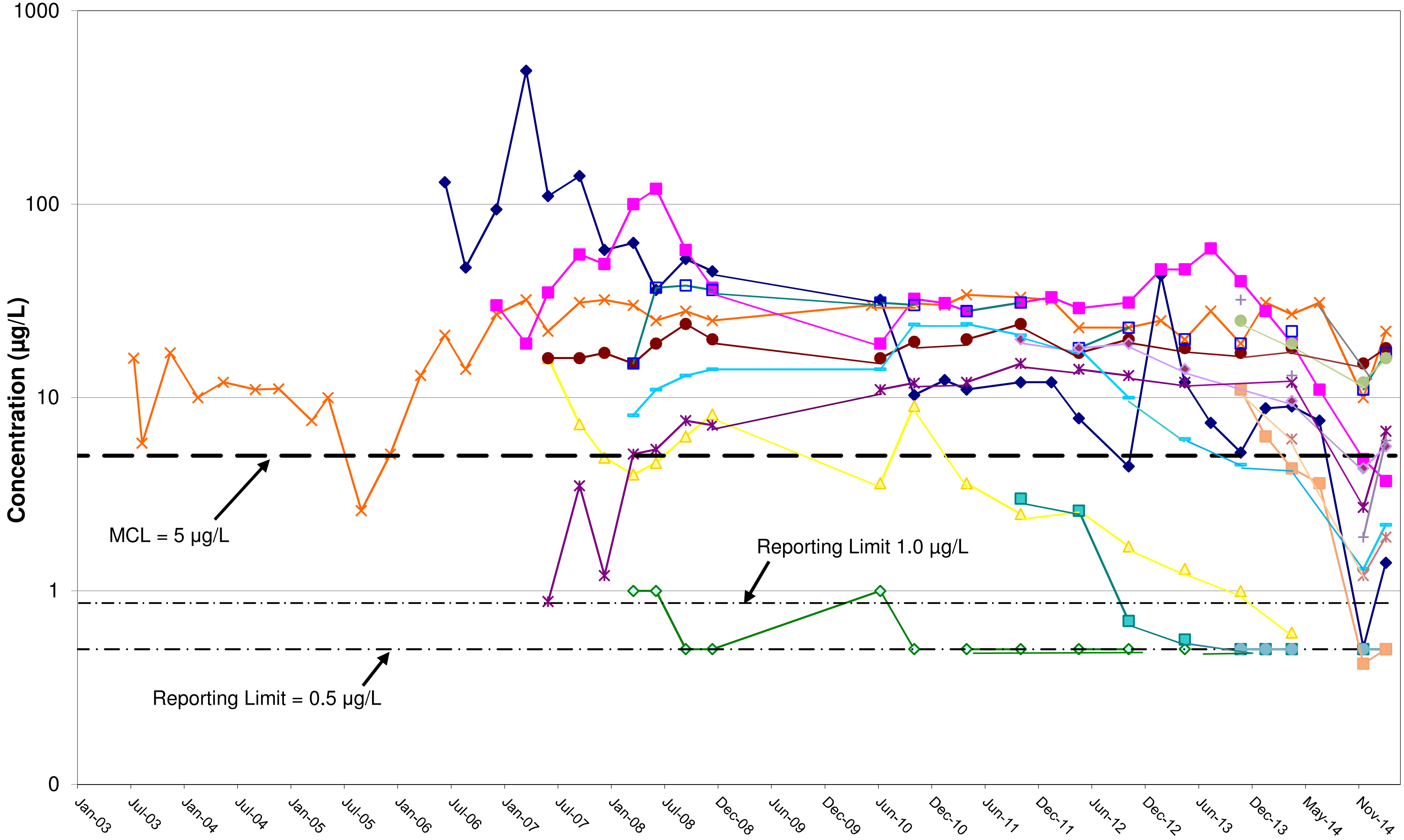
Note: Due to range of PCE concentrations detailed, y-axis is in a logarithmic scale.

HYDRO GEO CHEM, INC.

PCE CONCENTRATIONS IN ON-SITE MONITORING WELLS (MW-101 Through MW-103 & EW-101)

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	MJB	4/30/15	Figure 13	13

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Tables 9,10 Time-Series Plots_042815.xls: Figure 13



EXPLANATION

Note: PCE concentrations are presented on the y-axis in a logarithmic scale.

MW-104S	MW-105	MW-106	MW-107
MW-108	MW-109	MW-110	MW-111
MW-112	MW-113	MW-114	MW-115
MW-116	MW-117	MW-118	MW-119S

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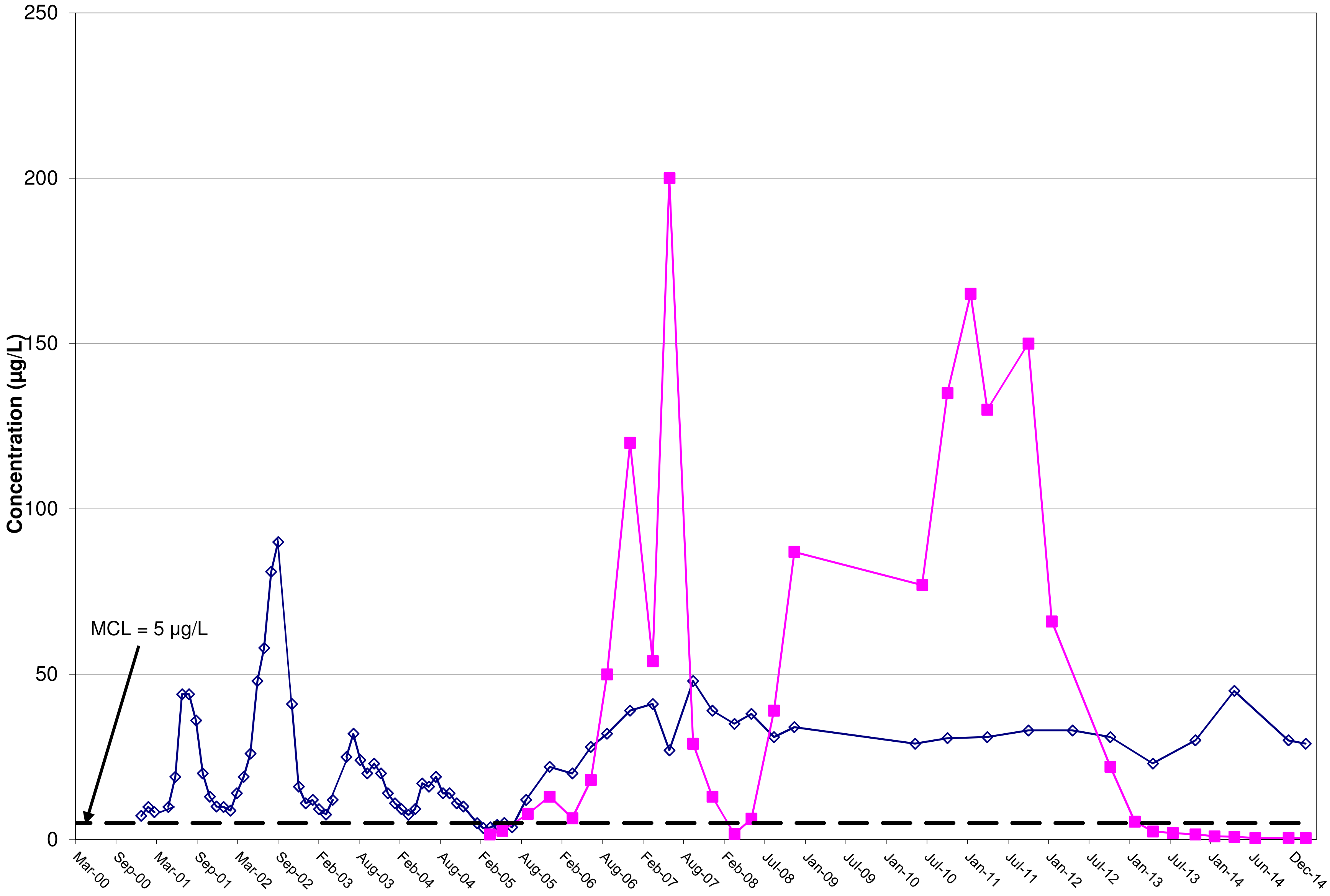
PCE CONCENTRATIONS IN OFF-SITE MONITORING WELLS (MW-104S Through MW-119S)

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	MJB	4/30/15	Figure 14	14



EXPLANATION

◇ G-9 ■ G-10

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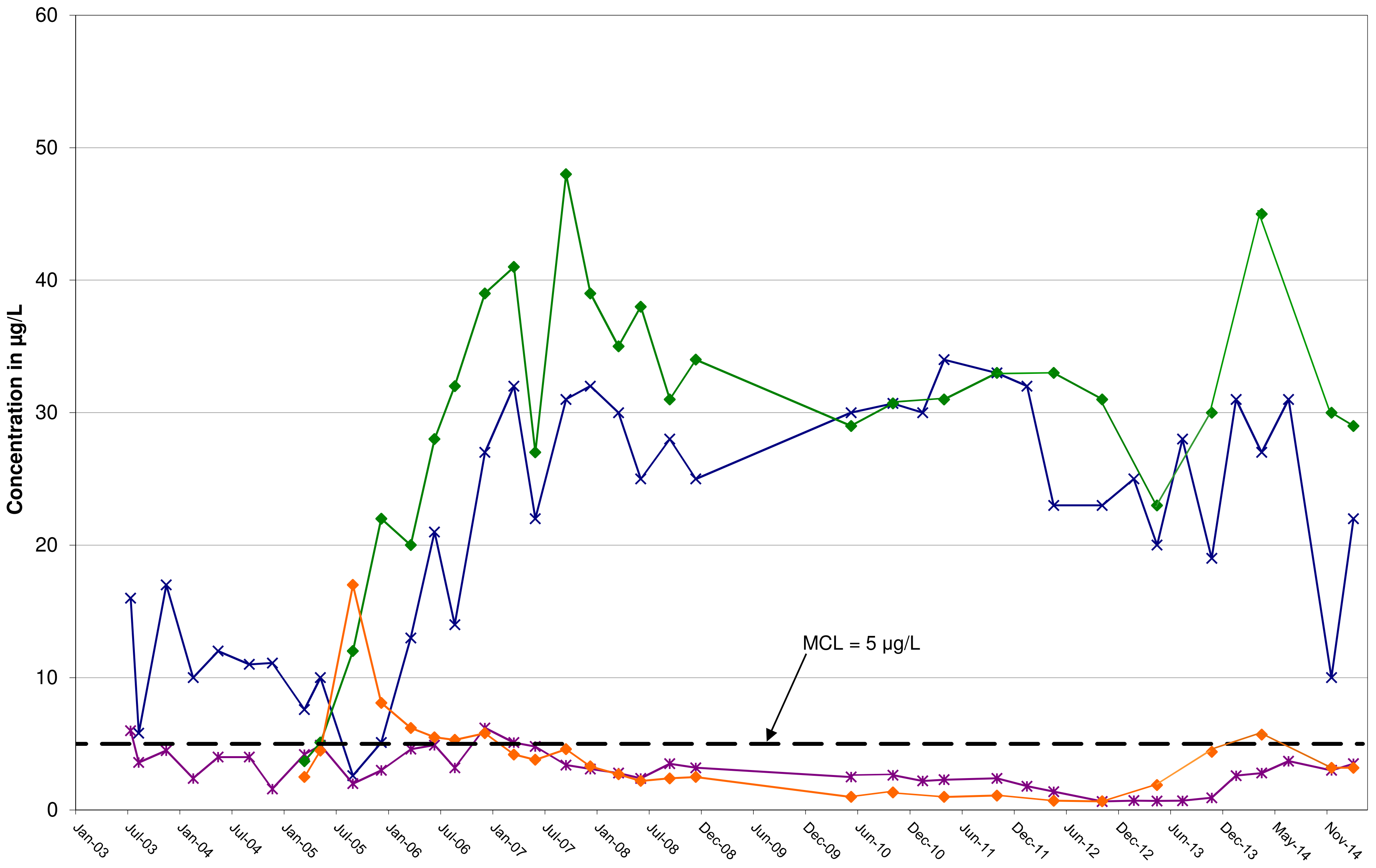
PCE CONCENTRATIONS IN
G-9 AND G-10

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	MJB	4/30/15	Figure 15	15

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Tables 9,10 Time-Series Plots_042815.xls



EXPLANATION

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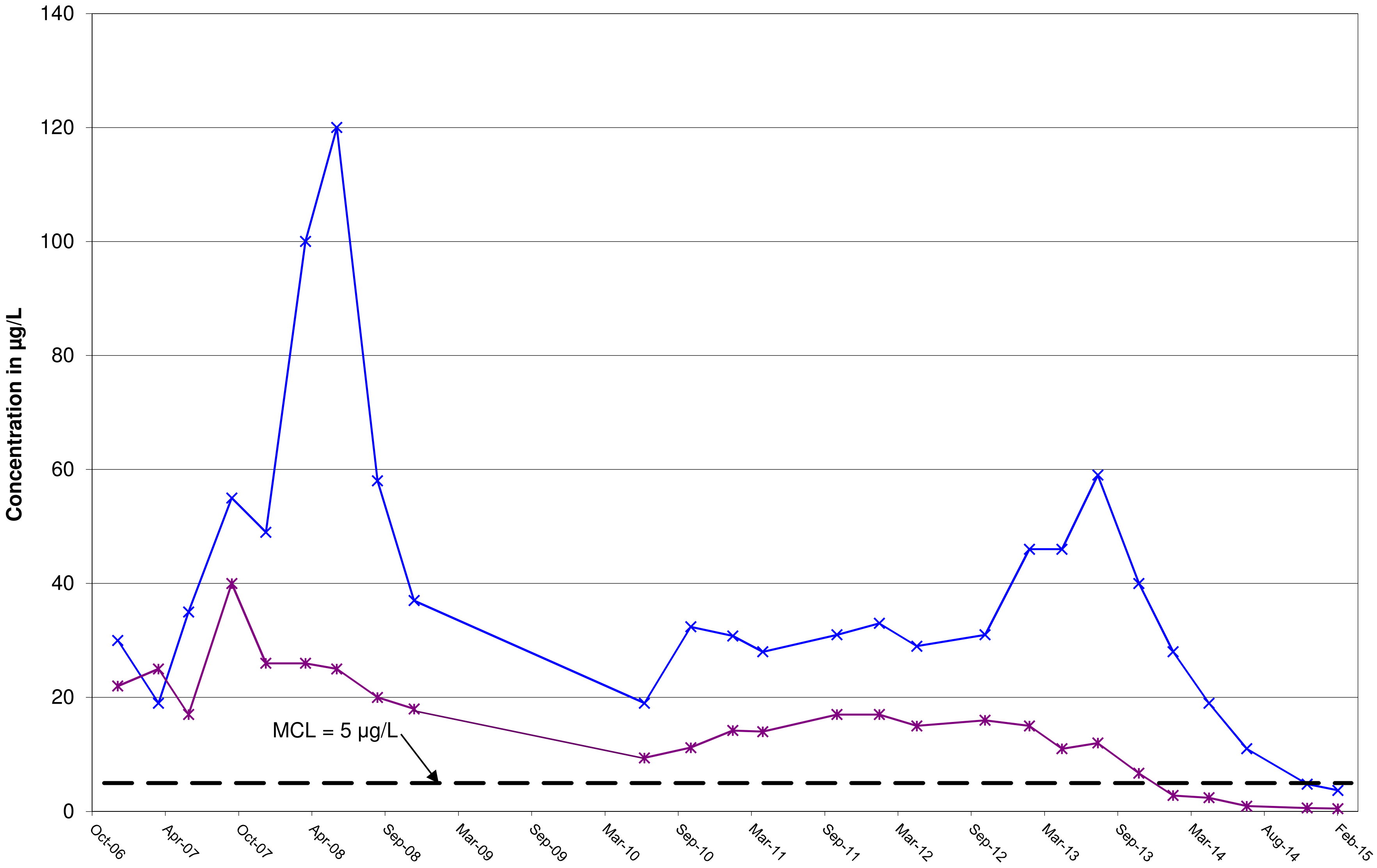
PCE AND TCE CONCENTRATIONS IN MW-104S AND G-9

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	MJB	4/30/15	Figure 16	16

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Tables 9,10 Time-Series Plots_042815.xls

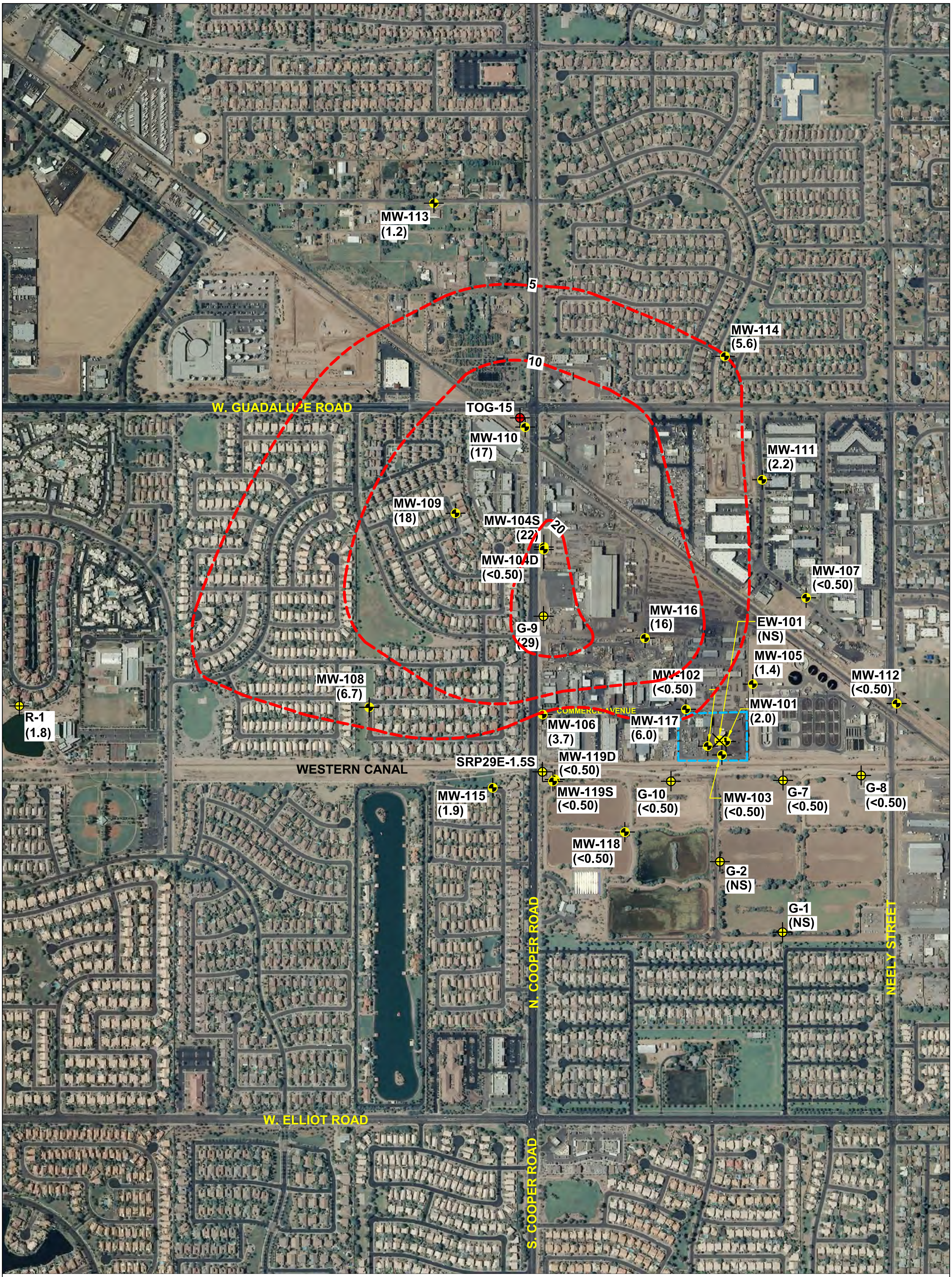


HYDRO GEO CHEM, INC.

PCE AND TCE CONCENTRATIONS IN MW-106

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	MJB	4/30/15	Figure 17	17

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Tables 9,10 Time-Series Plots_042815.xls



Legend

MW-101 (2.0)	Monitor Well and PCE concentration (ug/L)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Not Operating at Time of Sample Collection)
●	Well With Dedicated Pump (Currently Pumping)
▬	PCE concentration contour in ug/L
(NS)	Not Sampled
▭	Facility Boundary

<0.50 = Below Detection Limit

N

0 700
SCALE IN FEET

Note: Wells MW-104D and MW-119D not used for contouring. Groundwater sampling event conducted by Geosyntec Consultants February 2015.

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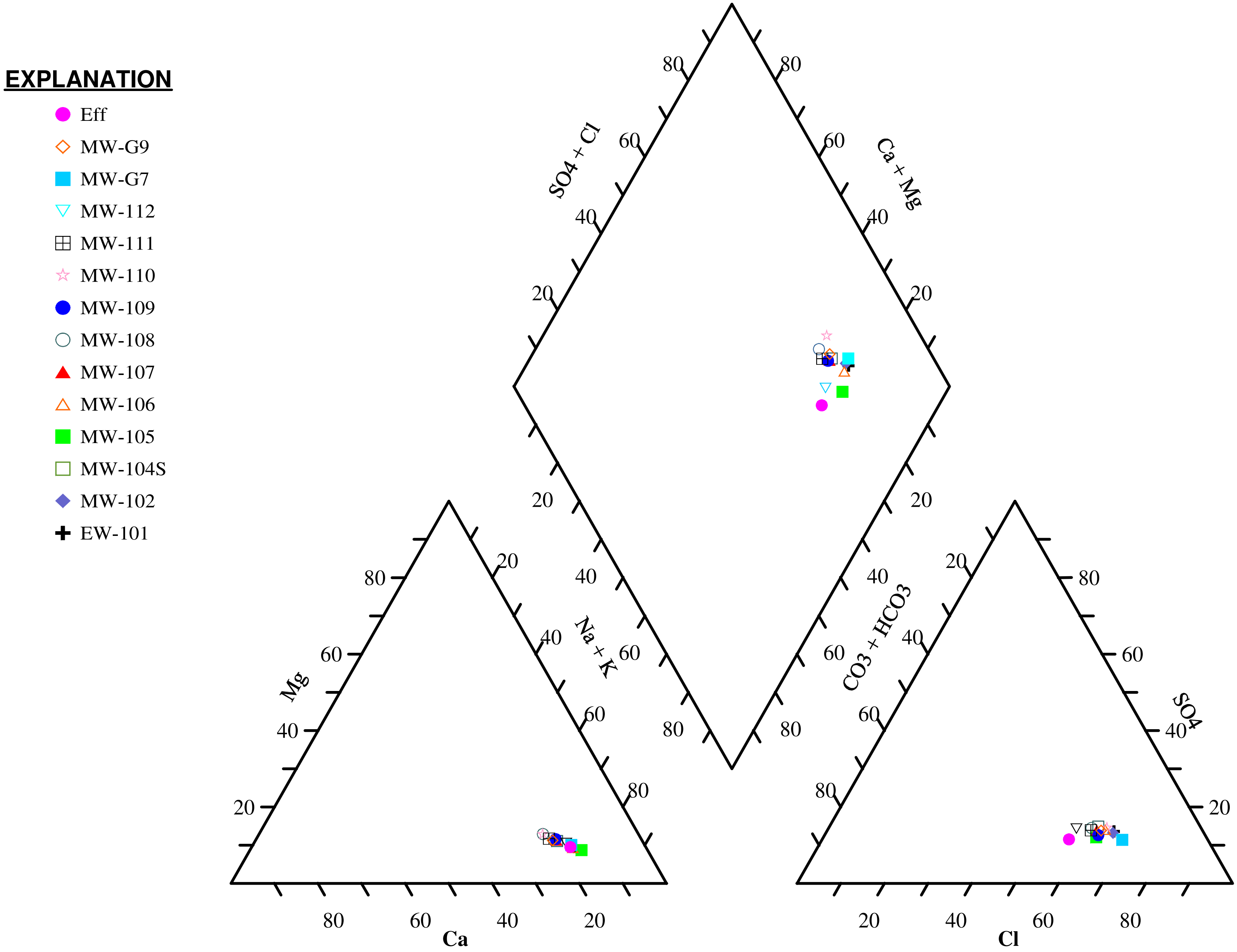
CHEM, INC.

PCE CONCENTRATION CONTOUR MAP
FEBRUARY 2015
COOPER AND COMMERCE WQARF SITE

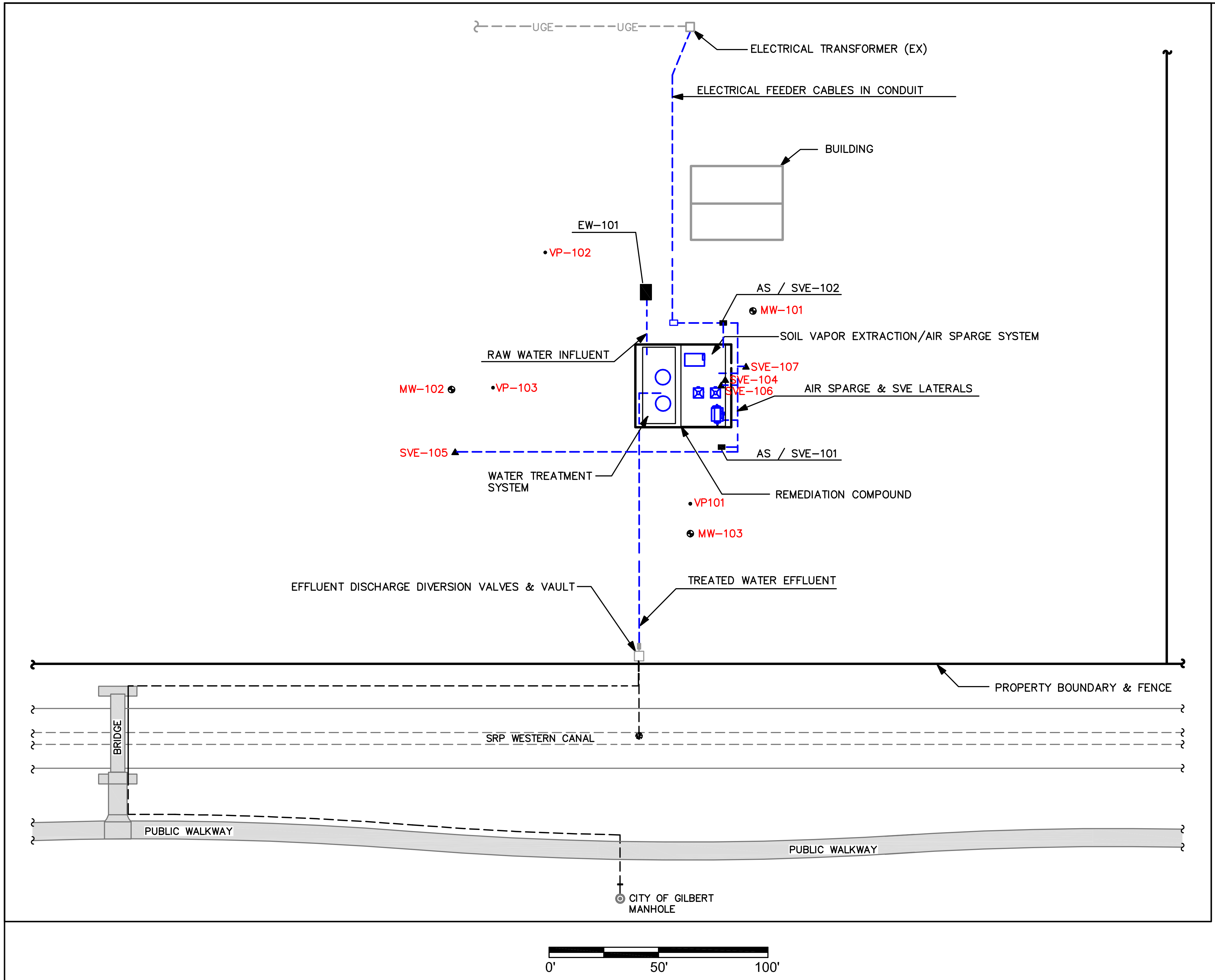
Approved	Date	Author	Date	File Name	Figure
FJS	6/11/15	JAA	6/11/15	2010002096A	18



HYDRO GEO CHEM, INC.

PIPER DIAGRAM OF MAJOR IONS IN GROUNDWATER AND EFFLUENT SAMPLES SECOND QUARTER 2008

APPROVED	DATE	REFERENCE	FIGURE
RP	6/17/2008	H:/833000/Reports/GW Monitoring Rpt/ 2nd qtr 2008/TRILIN/2Q 2008/2q2008.stf	19



SCALE IN FEET

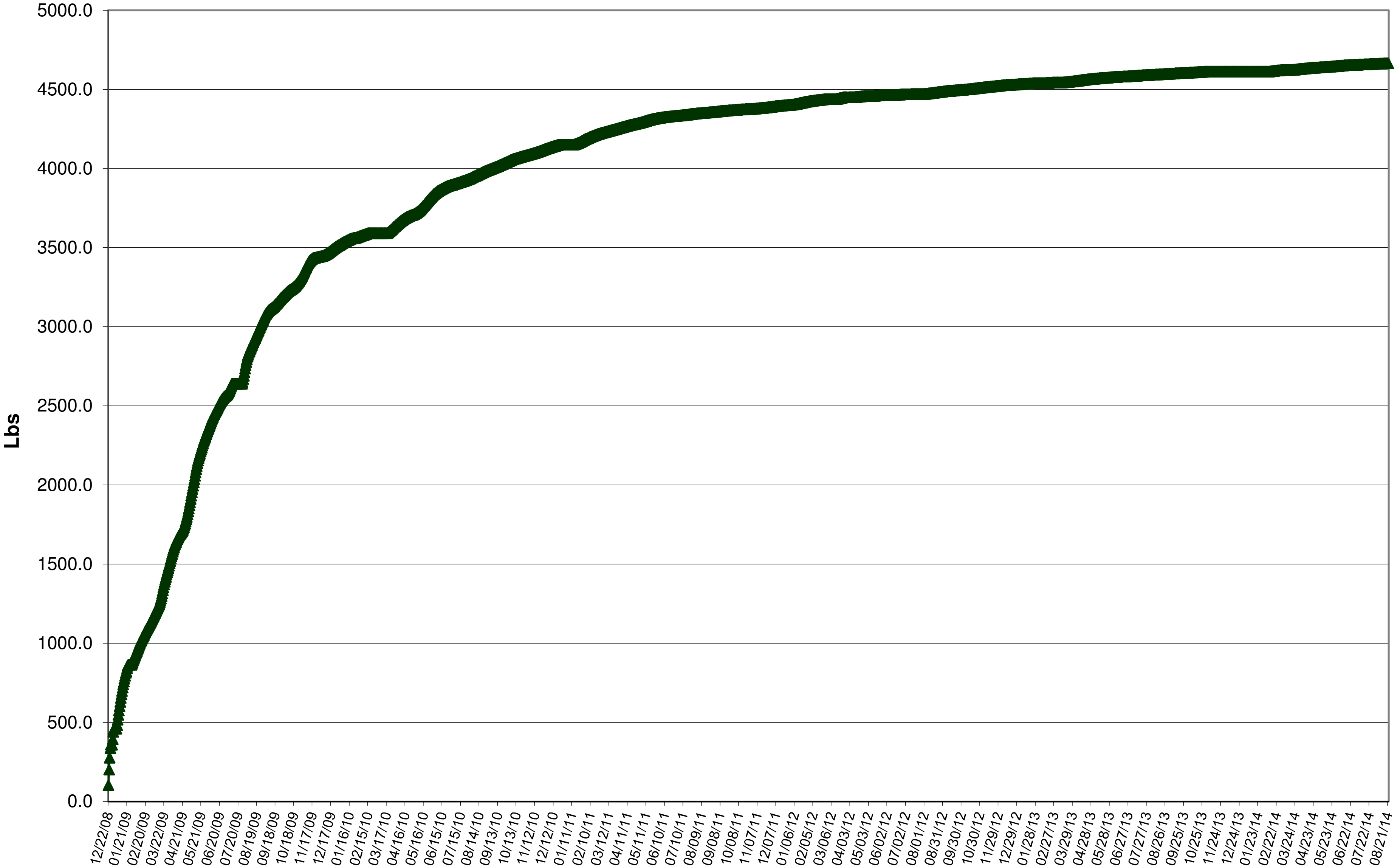
AS = AIR SPARGE WELL
EW = EXTRACTION WELL
MW = MONITOR WELL
SVE = SOIL VAPOR EXTRACTION WELL
VP = VAPOR MONITOR WELL

K:\2010002 CooperCommerce\DWGs\Figure 1-2010002038A.dwg

HYDRO GEO CHEM, INC.

REMEDIAL SYSTEM CONFIGURATION
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	Reference	Figure
CLJ	9/10/12	JAA	9/10/12	2010002038A	20



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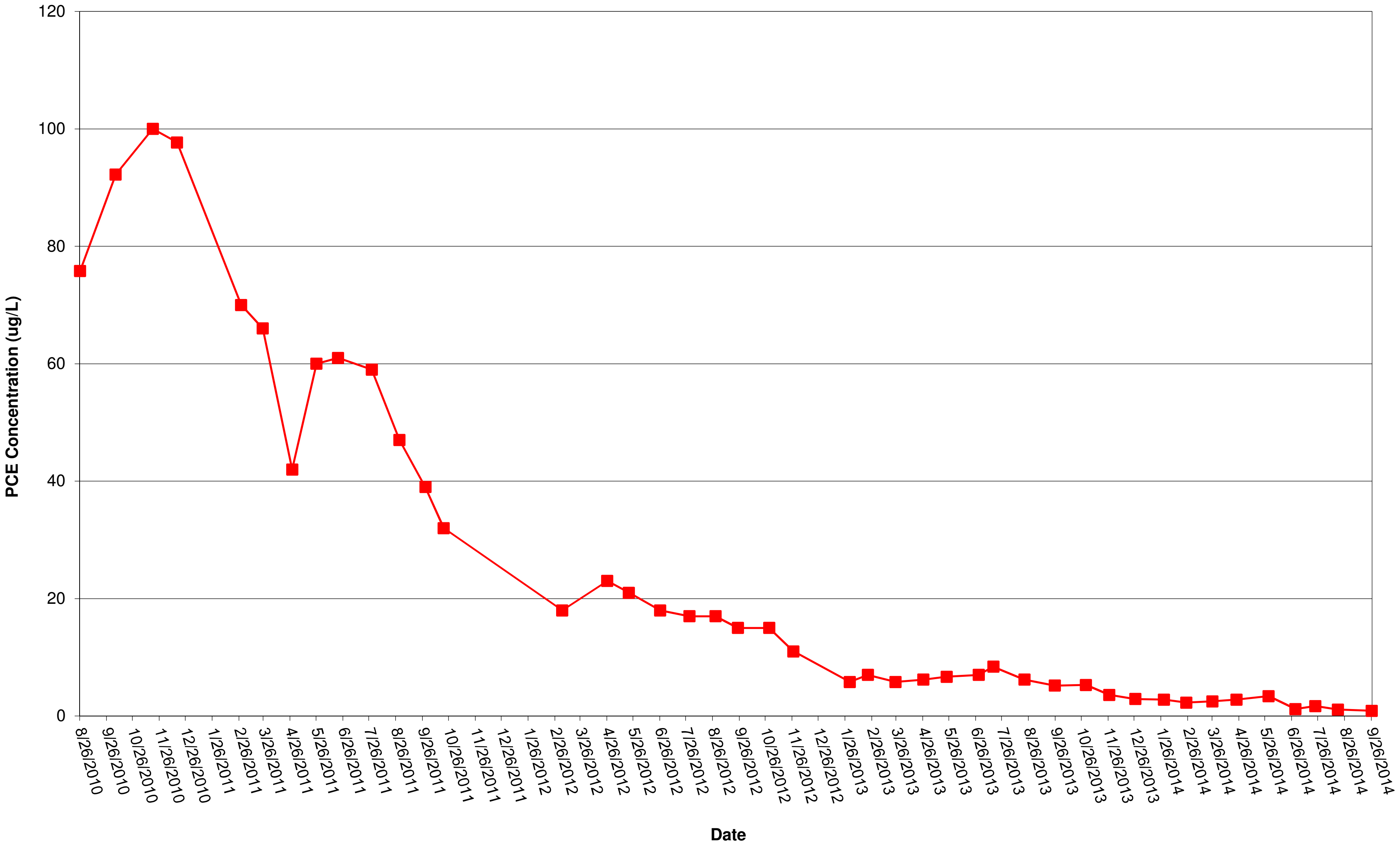
CHEM, INC.**

**COOPER AND COMMERCE AS/SVE SYSTEM
CUMULATIVE PCE/TCE RECOVERY (lbs)**

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/15	JAA	4/30/15	Figure 19	21

H:\2010002 ADEQ Cooper & Commerce\ERA O&M, GWM 2010002.04_.10_.20_.30\SVE-AS O&M\Quarterly SVE Reports\2014\SVEopp.xls: Figure 4



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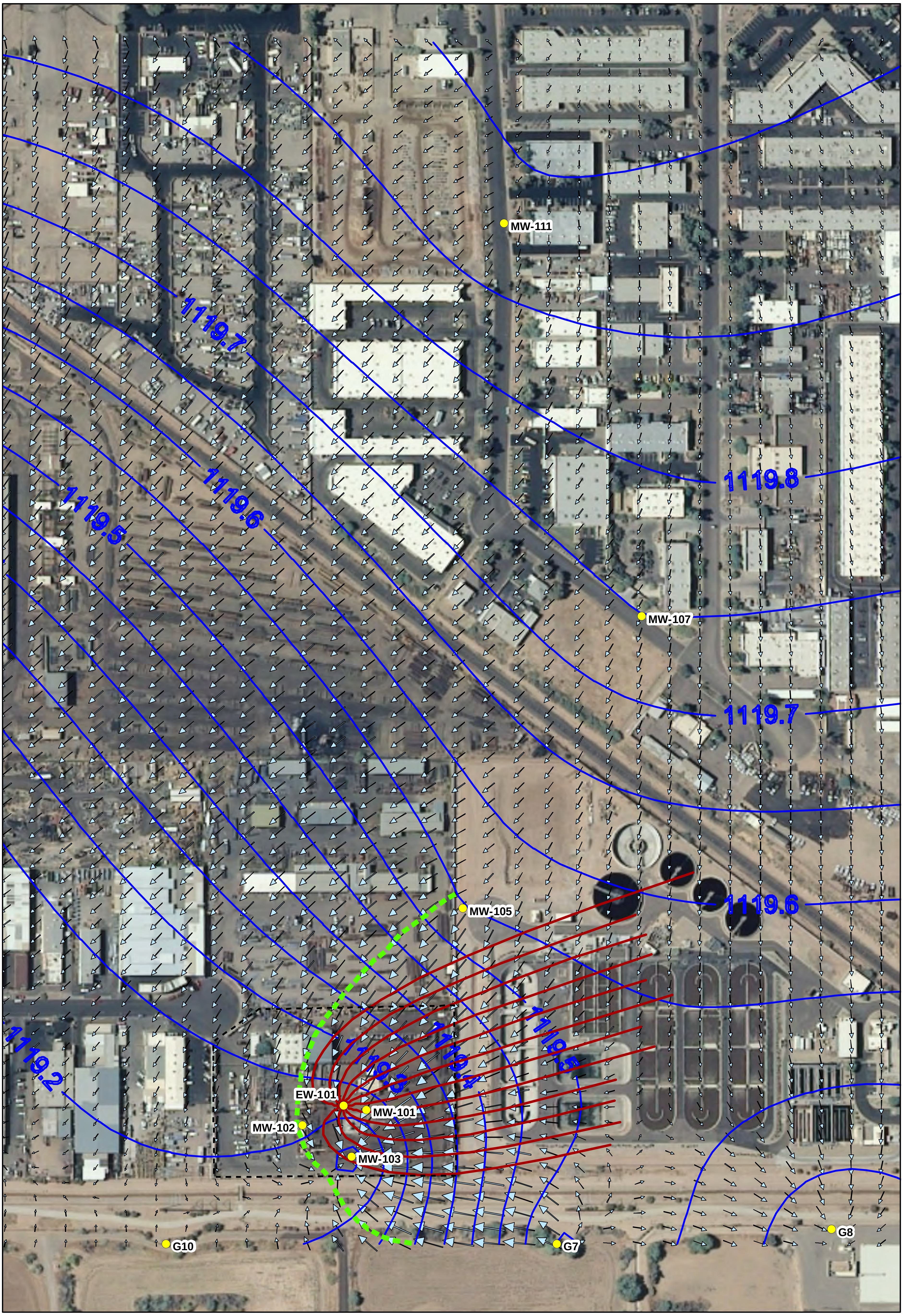
CHEM, INC.

COOPER AND COMMERCE
GROUNDWATER TREATMENT SYSTEM
INFLUENT PCE CONCENTRATION

Approved	Date	Author	Date	File Name	Figure
JAA	**4/30/15**	**JAA**	**4/30/15**	**Appendix B**	**22**

H:\2010002 ADEQ Cooper & Commerce\ERA O&M, GWM 2010002.04_.10_.20_.30\Water Treatment O&M Reports\2014\3Q2014 Table\Influent PCE conc.xls: App B



Explanation

● **MW-108** Monitor Well

- - - Skyline Steel Yard (Remediation System)

- - - Capture zone estimated from water level contours

— Capture zone estimation using site hydraulic properties and an analytical model

— Groundwater contours (ft amsl)

↖ Magnitude and direction of local hydraulic gradient

200 100 0 200 400
Feet

N

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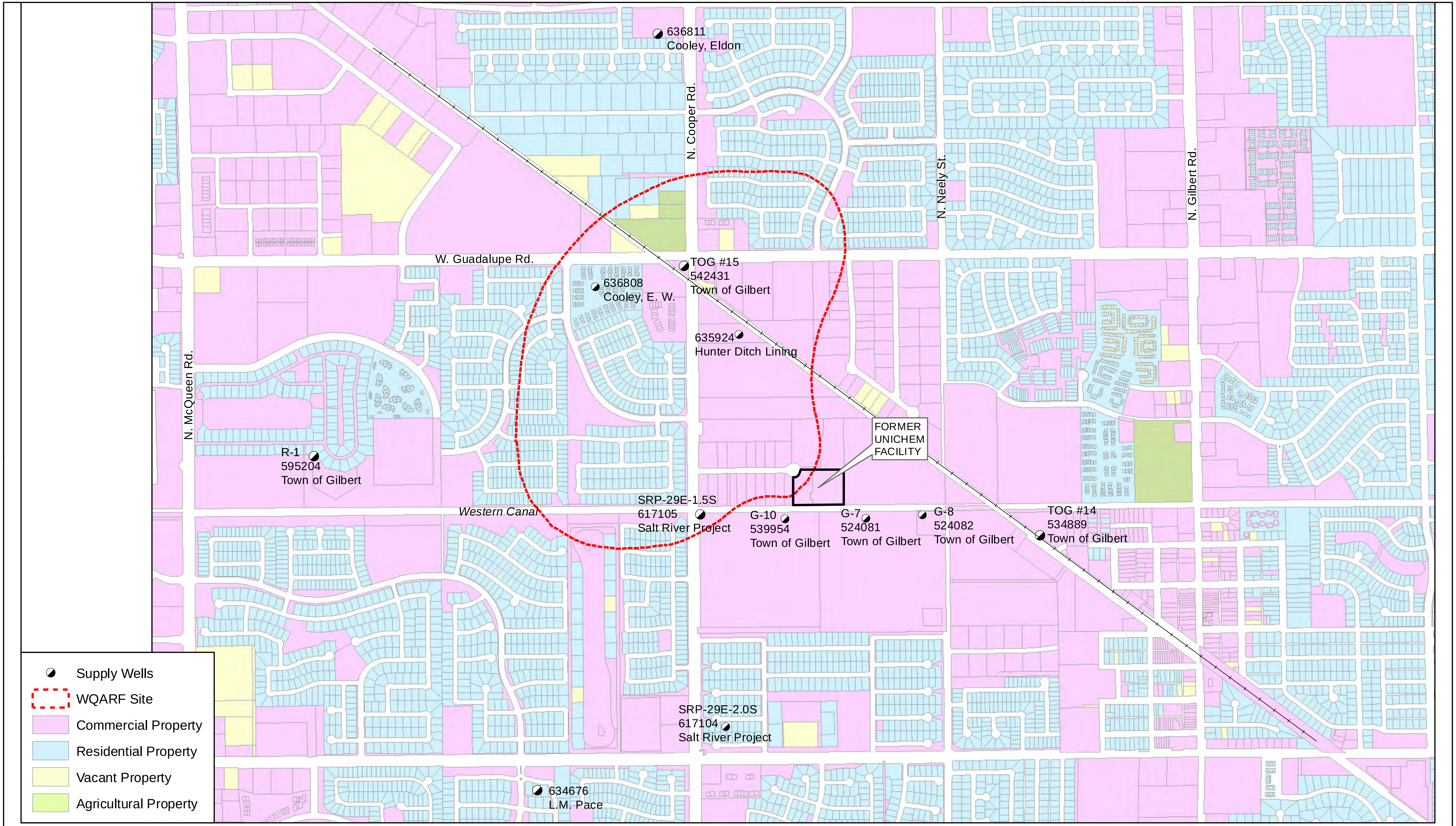
GROUNDWATER CAPTURE EVALUATIONS
USING OCTOBER 2010 GROUNDWATER DATA

Approved	Date	Author	Date	File Name	Figure
SJS	03/17/11	DRS	06/15/10	201000206G	23

K:\2010002 CooperCommerce\GIS\201000206G.mxd; Thursday, March 17, 2011 2:40:20 PM



Spatial Reference: NAD 1983 HARN State Plane Arizona Central FIPS 0202 Feet Intl

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CHEM, INC.

LAND USE & WATER SUPPLY WELLS
IN THE SITE VICINITY
COOPER COMMERCE SITE
GILBERT, ARIZONA

Approved	Date	File	Figure
MJB	04/29/14	201000209G_3	24

APPENDIX A

DETAILS OF DRILLING AND WELL CONSTRUCTION ACTIVITIES

APPENDIX A
DETAILS OF DRILLING AND WELL CONSTRUCTION ACTIVITIES

1. MONITORING WELL INSTALLATION

HGC installed additional monitoring wells in 2011 and 2013, in an effort to complete the delineation of the PCE contamination in groundwater. In 2011, HGC contracted Yellow Jacket Drilling (YJD) of Phoenix, Arizona to advance two borings and install monitoring wells MW-113 and MW-114 into the borings. In 2013, HGC contracted with National Exploration, Wells, Pumps (National) of Gilbert, Arizona to advance five borings and install monitoring wells MW-115, MW-116, MW-117, MW-118, and MW-119S into the borings. National was also tasked to advance one deep boring and install monitoring well MW-119D into the boring. This deeper well was installed in a similar interval and design as monitoring well MW-104D, to evaluate the PCE contamination previously identified in SRP well 29E-1.0S. Details regarding the newly installed monitoring wells are included in the following sections. The monitoring well locations are depicted on Figure 2 of the RI Report.

1.1 Drilling Summary

The drilling and well installation activities for monitoring wells MW-113 and MW-114 were conducted from June 6 to July 7, 2011. The borings were drilled by YJD using a CME-95 hollow-stem auger drill rig with STRATEX casing advance methods. Each borehole was a nominal 10 inches in diameter, and the total depth for each location was approximately 150 feet bls. Additional equipment supporting the drill rig included a supply truck, a decontamination trailer, and a wheeled front-end loader (Bobcat) to load soil cuttings into lined roll-off bins. Environmental Response, Inc. (ERI) provided 20 cubic yard roll-off bins to contain the drill cuttings from the installation of the monitoring wells. For the activities associated with the installation of monitoring wells MW-113 and MW-114, Mr. Neil Babb, G.I.T. of HGC directed the drilling, well installation activities, and the well development. Mr. Babb recorded various observations and test measurements as needed, and completed lithologic boring logs based upon grab samples collected at five-foot intervals and visual observations. Copies of the completed boring logs are provided in Appendix A.

The drilling and well installation activities for monitoring wells MW-115, MW-116, MW-117, MW-118, and MW-119S were conducted from August 26 to September 12, 2013. The borings were drilled by National using a Speedstar 50K air/mud rotary rig with casing hammer advance, and were drilled using air methods with a typical tri-cone bit. Each borehole was a nominal 10 inches in diameter, and the total depth for each location was approximately 150 feet bls. Additional equipment supporting the drill rig included a pipe truck, supply truck, two hoppers that captured drill cuttings and generated liquids dropping from the cyclone, and a forklift to transport and dump the filled hoppers into lined roll-off bins. ERI again provided 20 cubic yard roll-off bins to contain the drill cuttings from the installation of the monitoring wells. For the activities associated with the installation of these monitoring wells, Mr. Steven P. Sutherland, R.G. of HGC directed the drilling, well installation activities, and the well development. Mr. Sutherland also recorded various observations and test measurements as needed, and completed lithologic boring logs based upon grab samples collected at ten-foot intervals and visual observations. Copies of the completed boring logs for these monitoring wells are also included in Appendix A.

Upon completion of the activities associated with the installation of monitoring wells MW-115 through MW-119S, National began work on the installation of monitoring well MW-119D, located adjacent to monitoring well MW-119S. These drilling and well installation activities were conducted from September 12 to September 30, 2013. The boring was drilled by National using the same Speedstar 50K air/mud rotary rig as before, but was drilled using mud methods. Additional equipment supporting the drill rig included a pipe truck, supply truck, mud trailer with “shaker” screen system, two hoppers that captured the coarse fraction of the drill cuttings separated from the drilling fluid and dropping off of the shaker screens, and a forklift to transport and dump the filled hoppers into lined roll-off bins provided by ERI. Mr. Steven P. Sutherland, R.G. of HGC also directed the drilling, well installation activities, and the well development for this deep well. In addition to the completion of the lithologic boring log, based upon grab samples collected at ten-foot intervals and visual observations, geophysical logs were also completed for the borehole (Appendix E). A copy of the completed boring log for this monitoring well is also included in Appendix A.

The total borehole depth for MW-119D was 620 feet bls, and due to the presence of (primarily) gravels from approximately 70 feet bls to 270 feet bls, the borehole was initially drilled to 288 feet bls at a nominal diameter of 17 inches using a tri-cone bit. From the surface to this depth, a 0.25-inch walled 10-inch nominal diameter steel conductor casing was installed and grouted into place via tremie pipe with a bentonite grout. The conductor casing was installed to seal off the gravels and coarse grained lithology, and the associated communication of groundwater with the finer grained lithologies at depth. Once completed, a 9-7/8-inch diameter fin-style bit was used to drill the remainder of the borehole to 620 feet bls.

1.2 Lithologic Logging

Soil grab samples were obtained from the cuttings, and were used to classify soils and field screen for the presence of VOCs in vadose zone soils using a hand-held photo-ionization detector (PID) calibrated against an isobutylene standard (field screening was not conducted for the drilling of monitoring wells MW-113 and MW-114). Where field screening was conducted, soil samples were placed in plastic zip-lock bags, sealed, and labeled with sample depth and time. After a period of approximately 10 minutes to allow any VOCs to volatilize, the plastic bag was pierced with the tip of the PID and the head space in the plastic bag was analyzed. Head space VOC measurements and any odors and/or staining noted during sample collection were recorded on the boring logs.

The remaining soil sample was used to classify the soil. The soil was classified using the Unified Soil Classification System (USCS), as defined in ASTM D2487-11 (Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)). As part of the description, HGC also estimated the percentage of gravel, sand, and fine-grained materials, and estimated soil moisture as dry (D), moist (M), wet (W), or saturated (S). For clayey soil, the degree of plasticity was noted. Soil samples were not collected for laboratory analysis from the soil borings advanced during the installation of the monitoring wells in 2011 and 2013.

The lithology encountered during the drilling activities was primarily comprised of typical basin fill sands, silts and clays to approximately 70 feet bls, followed by an approximate 200-foot thick section of stream alluvium primarily comprised of well graded sands, coarse gravels, and cobbles. From approximately 270 feet bls to the total depth of 620 feet bls for MW-119D, the lithology transitions to alternating silty sands and sandy clays, with variable amounts of coarse sands and occasional gravels throughout. The groundwater depth was identified during the drilling activities to be from 105 feet bls to 110 feet bls. No obvious staining, odors, or high PID concentrations were noted at any of the well installation locations.

For the geophysical logs that were also generated for the boring associated with deep monitoring well MW-119D, HGC subcontracted Southwest Exploration Services, LLC to conduct open-hole geophysical logging of the deep well between the depths of 288 feet bls (base of the conductor casing) and 620 feet bls, to identify the optimal depth to place the screened interval for the monitoring well. The geophysical logging included spontaneous potential, single point resistance, short and long normal resistivity, gamma ray, neutron, and caliper logs. The caliper log was conducted prior to running the gamma-neutron source log, to evaluate borehole stability. Based upon a review of the completed geophysical logs, and a review of the boring log completed for MW-119D, the interpreted stratigraphy is described below:

- Silty sand to sandy clay - ground surface to 68 feet bls
- Sandy gravel/cobbles to gravelly sand - 68 to 250 feet bls
- Well graded sand to silty sand - 250 to 305 feet bls
- Sandy clay - 305 to 380 feet bls
- Silty sand - 380 to 415 feet bls
- Sandy/gravelly clay to silty sand - 415 to 550 feet bls
- Silty sand - 550 to 570 feet bls
- Gravelly clay - 570 to 580 feet bls
- Silty sand - 580 to 620 feet bls

After the review of the geophysical logs was completed, the screened zone for the deep well was selected to be set from 570 to 610 feet bls. A copy of the completed geophysical logs for MW-119D is included in Appendix E.

1.3 Well Construction and Completion Activities – Shallow Wells

Each of the shallow monitoring wells was constructed in the boreholes following the completion of the drilling activities and borehole preparation. The monitoring wells were all constructed in nearly the same manner. The well construction details included 4-inch outside diameter Schedule 40 polyvinyl chloride (PVC) solid casing from the ground surface to approximately 90 feet bls for each of the wells, followed by screened PVC casing with 0.020-inch slots from 90 to 145 feet bls. Each well then had a solid casing sump and end cap from 145 to 150 feet bls. Annular materials included 10/20 Colorado Silica Sand from 150 to approximately 87 feet bls, No. 60 silica sand from 87 to 85 feet bls, medium-sized bentonite chips for the bentonite seal from 85 to approximately 82 feet bls, and varying thicknesses of volclay grout followed by Portland cement grout to the near surface. Prior to grouting the wells and adding the bentonite seal for the monitoring well, each well was swabbed with a surge block to settle the filter pack and draw sediment out of the filter pack and screen into the well. Additional swabbing and bailing of sediments were conducted during the monitoring well development activities. Once the swabbing was completed for each monitoring well, the bentonite seal was placed and then the wells were grouted to the surface.

Once the wells were installed and grouted to the surface, typical traffic-rated flush-mounted vaults were set over monitoring wells MW-113, MW-114, MW-115 and MW-117, since each of these wells was located within a roadway. Above-ground completions were used for monitoring wells MW-116, MW-118, and MW-119S, which included the placement of bollards around the wells to minimize the potential for future damage to the wells. The wells were completed at the surface with two-foot diameter concrete skirts. The well name and ADWR Well Registration Numbers were stamped onto each well, and a lockable well seal was also placed on each wellhead (i.e., a 'J-plug'). Detailed well construction diagrams for each of these wells are presented in Appendix A. A summary of selected data regarding the new well installations is given in Table 1 of the RI Report.

1.4 Well Construction and Completion Activities – Deep Well (MW-119D)

After the completion of the geophysical logging activities, and the selection of the screened interval to be used for the well, the well construction activities commenced. The well construction details included 5-inch outside diameter Schedule 80 PVC solid casing from the ground surface to 570 feet bls, followed by screened PVC casing with 0.020-inch slots from 570 to 610 feet bls. The well then had a solid casing sump with stainless steel end cap from 610 to 615 feet bls. Annular materials included 8/12 Colorado Silica Sand from 620 to 547 feet bls, No. 60 silica sand from 547 to 544 feet bls, medium-sized bentonite chips for the bentonite seal from 544 to 532 feet bls, volclay grout from 532 to 20 feet bls, and Portland cement grout to the near surface. As before, the well was swabbed with a surge block to settle the filter pack prior to adding the bentonite seal and grout for the monitoring well. Additional swabbing and bailing of sediments was conducted during the monitoring well development activities. Monitoring well MW-119D was completed above-ground, which included the placement of bollards to minimize the potential for future damage to the well, and was finished with a three-foot diameter concrete skirt. The well name and ADWR Well Registration Number was stamped onto the well, and a 'J-plug' was used to seal the well casing). A detailed well construction diagram is presented in Appendix A.

1.5 Well Development

As was previously discussed, each of the monitoring wells was swabbed with a surge block after the filter pack was installed. After the installation of the monitoring wells was completed, the primary well development was conducted. For the shallow wells, the well development activities occurred at least 72 hours after the wells were constructed. However the well development activities began within 24 hours of completion of the deep well, in an effort to remove the remaining drilling fluid and products added to decrease the viscosity of the drilling fluid (so that it could be easily pumped and removed from the well). Initially, each well was swabbed again with a surge block, followed by bailing of the sediments using a decontaminated sand bailer (decontaminated between usages at each well). Bailing continued until it was determined that sufficient sediments had been removed from the well (based upon visual observations), so that pumping could begin. Between 25 to 200 gallons of water and sediments was bailed, depending upon the requirements of each well.

Once the bailing activities were completed, each well was pumped via installation of a 3-inch submersible pump into the wells, and pumping continued until each of the wells yielded clear water. For monitoring wells MW-113 and MW-114, the pumping rate was approximately 10 gallons per minute (gpm), and for the remaining wells the pumping rate was approximately 16 gpm (although the pump rate varied while pumping MW-119D at depth). The submersible pump was set in the shallow wells at a depth of approximately 145 feet bls (at the base of the screen). Approximately 200-800 gallons of water was purged from each well. For the deep well, the pump was set at three depths. Initially the pump was set at 300 feet bls, and the well was pumped until the purged water was relatively clear. The pump was then lowered to an approximate depth of 526 feet bls, and again the well was pumped until the purged water was relatively clear. The pump was then lowered to 590 feet bls, and the well was pumped until the purged water was clear. Approximately 2,000 gallons of water was purged from the deep well, which also cleared the well of the remaining drilling fluids. During the pumping of each well, water quality parameters (pH, temperature, conductivity and turbidity) were monitored by collecting samples from the discharge line until the purging parameters stabilized and were deemed complete for development purposes. Notes on clarity and color were also recorded. Copies of the well development records are included in Appendix G.

The bailed water and pumped water from the shallow wells (except for MW-119S) was captured in a 500-gallon water wagon, and was discharged into the sump in the groundwater treatment compound. The water was pumped from the sump into the groundwater treatment system, treated, and discharged to the SRP canal. The bailed and pumped water from MW-119S and MW-119D was captured in a lined and sealed 20 cubic yard roll off bin that was staged adjacent to these two wells. After the development activities were completed for MW-119S and MW-119D, a sample of the purged water was collected for analysis. The sample was collected in laboratory provided 40-milliliter VOA vials preserved with hydrochloric acid. The sample was submitted to Test America analytical laboratory of Phoenix, Arizona (Arizona Department of Health Services No. AZ0728) for the analysis for VOCs using EPA Method 8260B. Results of the analysis did not indicate the presence of any VOC constituents above AWQS, and based upon conversations and approval with the Town of Gilbert, the purged water in the roll off bin was pumped off into the closest basin within the TOG US&R project property (where the two wells are located). A copy of the analytical laboratory report for the sample collected from the roll off bin is presented in Appendix H.

1.6 Well Survey

HGC subcontracted Starlink Surveying, Inc. to survey the horizontal coordinates and top-of-casing elevations for each well. Starlink used the North American Vertical Datum of 1988 (N.A.V.D. 1988) for elevation and modified state plane coordinates using the North American Datum of 1983 (NAD 83) for horizontal control. The wells were surveyed shortly after they were all completed, and the survey data has been incorporated into all appropriate tables and figures. Copies of the well survey, including well names, northings and eastings, land surface elevation, and measuring point elevations at the top of casing for each monitoring well are presented in Appendix G. A summary of the survey data for the newly installed monitoring wells is given in Table 1 of the RI Report.

1.7 Investigative-Derived Waste Management

ERI provided roll off bins for the storage of the drill cuttings generated from the installation of the monitoring wells in both 2011 and 2013, and also provided the roll off bin used to temporarily store purged development water from MW-119S and MW-119D. The drill cuttings were stored in 20 cubic-yard, lined steel roll-off bins. As the soil cuttings were generated from the installation of monitoring wells MW-113 and MW-114, soil samples were collected from the roll off bins for characterization. Samples ‘IDW Rolloff #96011’, ‘IDW Rolloff #96012’, ‘IDW Rolloff #66181’ and ‘IDWROLLOFF #66185’ were collected and submitted to Test America, and were analyzed for VOCs EPA Method 8260B. For the cuttings generated from the installation of monitoring wells MW-115, MW-116, MW-117, MW-118, MW-119S and MW-119D, one composite soil sample was collected from the roll off bins for analysis (Sample ‘IDW’). This sample was also submitted to Test America, and was analyzed for the presence of total petroleum hydrocarbons (TPH) in the diesel and oil range (C_{10}-C_{32}) via ADHS Method 8015AZ.R1, VOCs via EPA Method 8260B, polynuclear aromatic hydrocarbons (PAHs) via EPA Method 8310, 8 RCRA metals via EPA Methods 6010B and 7471A, and paint filter via EPA Method 9095B. The analytical results of the samples from both drilling events were used to generate approved waste profiles to dispose of the soil cuttings generated from the monitoring well installation locations.

The analytical results of the samples collected from the cuttings generated in 2011 did not indicate the presence of any VOC constituents above their respective laboratory reporting limits. The results of the composite soil sample collected from the soil cuttings generated in 2013 did not indicate any TPH in the diesel and oil range (C_{10}-C_{32}), VOCs, or PAH constituent concentrations above their respective laboratory reporting limits. Furthermore, no free liquids were indicated in the Paint Filter Liquids test. The metals arsenic, barium, chromium, and lead were identified at reportable concentrations in the sample. Arsenic was detected at 8.3 mg/kg, barium at 110 mg/kg, chromium at 35 mg/kg, and lead at 5.5 mg/kg. None of the reportable metal concentrations exceeded their respective ADEQ residential soil remediation levels (SRLs), and are typical naturally occurring background metals concentrations in the Phoenix metropolitan area. Copies of the analytical laboratory reports presenting the results of testing performed on the IDW samples are presented in Appendix H.

The analytical results of the tests performed on the IDW samples were used to generate waste profiles. The waste profile for the cuttings generated in 2011 was submitted to Republic Services, Inc. (formerly known as Allied Waste) for review and approval, to dispose of the soil cuttings as a non-hazardous waste. Republic Services approved the waste profile and materials for disposal, and the cuttings were transported by ERI for disposal to the Southwest Regional Landfill in Buckeye, Arizona. The waste profile for the cuttings generated in 2013 was also submitted to Republic Services for review and approval to dispose of the soil cuttings as a non-hazardous waste. Republic Services approved the waste profile for these cuttings, and materials for disposal at the Apache Junction Landfill in Apache Junction, Arizona. Copies of the waste profile sheets, signed and completed non-hazardous waste manifests, and landfill scale receipts are included in Appendix H.

APPENDIX B

MONITORING WELL DEVELOPMENT AND SURVEY DATA

STARLINK SURVEYING, INC.
7836 W. Adobe Drive
Glendale, AZ 85308
Phone: 623-322-1116
Fax: 623-322-4637

July 10, 2011

Chris Jacquemin
Hydro Geo Chem, Inc.
6340 E. Thomas Road, Ste.224
Scottsdale, Arizona 85251

Re: Cooper Road & Commerce Avenue Site
Well Coordinates

Dear Mr. Jacquemin,

The coordinates and elevations for the monitoring wells that were surveyed by Starlink Surveying, Inc. at the Cooper Road and Commerce Avenue site are presented below. The vertical datum is N.A.V.D. 1988 for elevation and modified state plane coordinates using the North American Datum of 1983 (NAD 83) for horizontal control. The reference control point and benchmark used G.D.A.C.S. Pt #22039-1, a 3" Gilbert Brass Cap in Handhole, 0.5' down at the N.E. corner, Sec. 11, T. 1 S., R. 5 E., coordinates and elevation shown below.

	Northing	**Easting**	**Elevation**
Control	860111.66	733455.28	1222.47

Well	**Northing**	**Easting**	**Elevation**
EW-101	857665.44	734823.51	1224.50
MW-103	857555.10	734842.45	1226.10
MW-113	861613.69	732693.72	1219.10
MW-114	860496.21	734877.06	1223.76
SVE-105	857593.14	734738.32	1226.06
G-10	857362.03	734441.70	1230.45

Sincerely,

Stephen J. Shearrow

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
40937
STEPHEN J.
SHEARROW
Date Signed 7/10/11
ARIZONA U.S.A.
Expires 06/30/2013

STARLINK SURVEYING, INC.
17505 N. 79th Avenue, Suite 311A
Glendale, AZ 85308
Phone: 623-322-1116
Fax: 623-322-4637

February 6, 2014

Frank Skocypec
Hydro Geo Chem, Inc.
6340 E. Thomas Road, Ste.228
Scottsdale, Arizona 85251

Re: Cooper Road & Commerce Avenue
Well Coordinates

Dear Mr. Skocypec,

The coordinates and elevations for the monitoring wells that were surveyed by Starlink Surveying, Inc. at the Cooper Road and Commerce Avenue site are presented below. The vertical datum is N.A.V.D. 1988 for elevation and modified state plane coordinates using the North American Datum of 1983 (NAD 83) for horizontal control. The reference control point and benchmark used G.D.A.C.S. Pt #22039-1, a 3" Gilbert Brass Cap in Handhole, 0.5' down at the N.E. corner, Sec. 11, T. 1 S., R. 5 E., coordinates and elevation shown below.

	Latitude	**Longitude**	**Elevation**
Control	33°21'51.7125"	-111°48'25.5432"	1222.47

Well	**Latitude**	**Longitude**	**Elevation**
MW-115	33°21'23.7055"	-111°48'28.6814"	1222.97
MW-116	33°21'35.0411"	-111°48'15.2941"	1227.05
MW-117	33°21'29.8549"	-111°48'12.4381"	1225.38
MW-118	33°21'20.5856"	-111°48'17.1213"	1230.61
MW-119D	33°21'24.5669"	-111°48'23.4276"	1231.25
MW-119S	33°21'24.4171"	-111°48'23.5918"	1230.94
G-1(TOG)	33°21'20.5856"	-111°48'17.1213"	1232.02
G-2(TOG)	33°21'18.3464"	-111°48'09.4018"	1231.65
R-1(TOG)	33°21'31.0378"	-111°49'12.3367"	1214.94

Stephen J. Shearrow

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
40937
STEPHEN J.
SHEARROW
Date Signed 2/6/14
ARIZONA U.S.A.
Expires 06/30/2016

MW-113

HYDRO GEO CHEM, INC.

Well Development Form

Name/Number: MW-113 Well Development [redacted]
Sampler: ~~NJ. Babb~~ Sean J [redacted]

Well No: ______ Project No: 2010002.03, T8.1
Date: 7/18/11

WELL INFORMATION

Casing Diameter ("d", in.): 4"
Well/Packer Depth ("a", ft): ~150 = 150.6
One Wetted Casing Volume: (a - b) • d^2 • 0.0408 = 36.0
Screened Interval (ft) From: ~90 To: 145
Depth to Water ("b", ft): 94.6' [redacted]
Gallons, (3 Casing Volumes ___ gal) 109.7

BAIL & PURGE INFO AND FIELD MEASUREMENTS

Time Started: 745 (bailing) 900 (pumping)
Purge Method: bailed + pumped
Pump Setting: ~10 gpm
Time Completed: 1015
Total Development Time: ___ -min 135 min
Total Bail & Purge Volume: 670-gallons 670 gal

	Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (ºC)	Conductivity (µS/cm)	pH	Turbidity (NTUs)	DTW ← top of well (ft btoc)	Notes	Meter) (gal)	DO (ppm)
@126' ↓	904	9.5	28.5	3180	6.69	161	94.70	Started Pumping	37390	1616
	911	10.2	28.1	3151	7.05	46.6	94.75			1610
	918	9.4	~~26.0~~ 27.3	3185	6.94	26.0	94.80		37570	1625
	924	9.1	27.1	3152	7.08	19.5	94.80			1607
	930	9.0	27.5	3155	6.84	16.6	94.80	lowered pump	37650	1609
@147' ↓	935						97.3		37650	
	937	9.25	27.8	3142	7.18	235	94.5			1600
	940	|	27.3	3180	7.07	624	"			1624
	943	|	26.7	3186	7.04	30.0	"		37710	1622
	946	9.5	27.0	3174	7.13	22.2	94.5			1616
	950	"	26.7	3151	7.03	15.5	"		37760	1600
	954	"	26.7	3141	7.04	12.8	"		37820	1601
	956	"	26.1	3130	7.13	11.0	"		37840	1595
	1000	"	26.2	3144	7.15	11.4	"		37870	1601
	1003	"	26.4	3138	6.97	18.2	"			1596
	1006	9.5	26.4	3172	7.06	7.74	94.75			1616
	1009	9.5	26.1	3107	7.15	8.05	"		37960	1586
	1012	"	26.2	3160	7.18	7.13	"			1614
	1015	9.5	26.1	3151	7.14	6.61	"	Stopped pumping	38020	1604
								took 3 samples		

MW-113-A
MW-113-B
MW-113-C

630.0 gal
↑
pumped

bailed = 40 gal

~

MW-114

HYDRO GEO CHEM, INC.

Well Development Form

Name/Number: MW-114 Well Development
Sampler: ~~NJ. Babb~~, Sean J

Well No: ____ Project No: 2010002.03-8.1
Date: 7-18-11

WELL INFORMATION

Casing Diameter ("d", in.): 4"
Well/Packer Depth ("a", ft): ~152 =150.6
One Wetted Casing Volume: (a - b) • d^2 • 0.0408 = 33.6 gal Gallons, (3 Casing Volumes ___ gal) 100.9
Screened Interval (ft) From: ~90 To: 145
Depth to Water ("b", ft): 99.1'

BAIL & PURGE INFO AND FIELD MEASUREMENTS

Time Started: 1120 (bailed) 1223 (pumped)
Purge Method: bailed & pumped
Pump Setting: ~10 gal/min
Time Completed: 1350
Total Development Time: ___-min 150 min
Total Bail & Purge Volume: ___-gallons 840 gal

	Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (µS/cm)	pH	Turbidity (NTUs)	DTW (ft btoc) top of well	Notes Motor 38150	DO (ppm)
@126'	1224	9.5					99.0	Start pumping, very dirty	
	1227	"	24.9	1742	7.31	71000	99.35		902
	1233	9.5	25.7	1851	7.30	71000	99.35	38240	952
	1241	"	26.0	2025	7.33	836	"		1035
	1245	"	26.6	2067	7.31	329	"	38350	1030
	1252	9.5	27.4	2073	7.31	84.8	"	38410	1058
@147'	1300	"	29.1	2220	7.24	823	99.35	Advanced pump 38440	1136
	1303	"	26.3	2150	7.14	210	"	38470	1099
	1306	"	26.7	2129	7.29	128	"	38500	1088
	1309	9.6	26.9	2113	7.26	69.6	99.35	~~38560~~	1079
	1313	"	26.2	2146	7.26	43.5	"	38560	1093
	1316	"	26.3	2135	7.27	53.0	"	38590	1087
	1319	9.5	26.3	2145	7.30	32.6	99.3	38620	1098
	1323	"	26.7	2137	7.25	26.3	"		1088
	1327	"	26.9	2134	7.30	17.9	"	38690	1087
	1330	"	26.6	2120	7.22	16.3	99.3		1082
	1332	9.5	25.6	2130	7.34	13.9	"	38750	1075
	1335	"	26.3	2132	7.31	12.0	"		1086
	1337	"	26.7	2124	7.31	11.3	"	38770	1084
	1339	"	26.4	2150	7.28	9.85			1096

3 NTUS under 10 ppm

Total Pumped = 740 gal
Total bailed = 100 gal
840 gal

H:\8740000\CCs-16 & 18.Well Install Data\well development

HYDRO GEO CHEM, INC.
Well Development Form

Well No: ______ Project No: ______

Name/Number ______

Date: ______

Sampler: NJ. Babb /

WELL INFORMATION

Casing Diameter ("d", in.): ______

Screened Interval (ft) From: ______ To: ______

Well/Packer Depth ("a", ft): ______

Depth to Water ("b", ft): @ ______

One Wetted Casing Volume: (a - b) • d² • 0.0408 = ______

Gallons, (3 Casing Volumes ___ gal)

BAIL & PURGE INFO AND FIELD MEASUREMENTS

Time Started: ______

Time Completed: ______

Purge Method: ______

Total Development Time: -min

Pump Setting: ______

Total Bail & Purge Volume: -gallons

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (µS/cm)	pH	Turbidity (NTUs)	DTW (ft btoc)	Notes	
1341	9.5	26.1	2146	7.30	10.0	99.35		1095
1344	"	26.5	2140	7.27	8.39	"	38860	1070
1347	9.5	26.2	2098	7.33	8.35	99.35	3 samples obtained 38890	1054
							↳ MW-114-A	
							MW-114-B	
							MW-114-C	

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & Commerce WQARF
Project No.: 2010002.60.8.1
Well ID: MW-115

Static Depth to Water (feet btoc): 10460'
Total Depth of Well (feet btoc): 150'

Date: 10/18/13
Time Started: 1527
Purge Method: Submersible

Time Completed: 1607
Pump Setting: ~139' bgs

Total Purge Time: 40 minutes
Total Purge Volume: 240 gallons (+90 gallons bailed)

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
1355									Begin bail, swab, bail activities
1403									Completed ~ 90 gallons
1532	6	104.68	24.5	1975	7.07	1100			Cloudy, brown
1542	6	104.70	24.6	1988	7.08	85			Hazy, colorless
1552	6	104.70	24.5	2160	7.02	21			slightly hazy, colorless
~~15~~1602	6	104.70	24.5	2180	7.08	8.1			

Note: btoc = below top of casing

H:\Field Forms\Well Development Form.xls: WellDevForm

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & ~~Commerce~~ WQARF
Project No.: 2018002.60, [illegible].1
Well ID: MW-116

Static Depth to Water (feet btoc): 108.44
Total Depth of Well (feet btoc): 150'

Date: 10/18/18
Time Started: 1158
Purge Method: submersible

Time Completed: 1248
Pump Setting: 137'

Total Purge Time: 50 mins
Total Purge Volume: 350 gallons (+25 gallons bailed)

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
1045									Begin bail, swab, bail
1115									Complete
~~1158~~/1203	6	108.56	24.5	2660	7.13	500			Cloudy, light brown
1213	6	108.55	24.3	2650	7.12	60			Slightly hazy, colorless
1223	6	108.55	24.2	2660	7.12	26			" "
1233	6	108.55	24.2	2660	7.12	17			Clear, colorless
1243	6	108.55	24.2	2660	7.12	9.7			"

Note: btoc = below top of casing

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & Commerce WQARF
Project No.: 2010002.60 (8.1)
Well ID: MW-117

Static Depth to Water (feet btoc): 106.60'
Total Depth of Well (feet btoc): 150'

Date: 10/18/13
Time Started: 0910
Purge Method: submersible

Time Completed: 0940
Pump Setting: 139'

Total Purge Time: 30 mins
Total Purge Volume: 180 gallons
(+40 gallons bailed)

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
0745									Begin bail, swab, bail of sediments
0830									Complete
0915	~~8~~ 6	106.55	23.4	2300	7.16	310			hazy light brown
0925	~~8~~ 6	106.55	23.6	2300	7.18	40			slightly hazy, colorless
0935	~~8~~ 6	106.56	23.6	2300	7.16	14			clear, colorless

Note: btoc = below top of casing

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & Commerce WQARF
Project No.: 2010002.60,8.1
Well ID: MW-118

Static Depth to Water (feet btoc): ~108' bgs
Total Depth of Well (feet btoc): ~150' bgs

Date: 9/30/13
Time Started: ~~0820~~ 1003
Time Completed: 1035
Total Purge Time: 33 minutes
Purge Method: submersible pump & bailer
Pump Setting: 150' @ ~5 gpm
Total Purge Volume: 160 gallons (+ ~200 gallons bailed)

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
0820	0	~108'							Begin swabbing
0836									Swabbing Completed. Begin bailing
0936									Bailing Completed. ~200 gallons bailed.
1003 Begin	5 gpm								
1005			23.3	2540	7.08	950			Cloudy - Brown
1010			23.5	2540	7.03	360			Slightly Cloudy
1015			23.4	2530	7.06	55			Hazy
1020			23.3	2490	7.04	24			Hazy
1025			23.4	2500	7.06	15			Slightly hazy
1030			23.4	2480	7.10	11			Clear
1035			23.4	2480	7.10	7.5			Clear

Note: btoc = below top of casing

H:\Field Forms\Well Development Form.xls: WellDevForm

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & Commerce WQARF
Project No.: 2010002.60, 8.1
Well ID: MW-119S

Static Depth to Water (feet btoc): 122.82'
Total Depth of Well (feet btoc): 150' bgs

Date: 10/17/13
Time Started: 1425
Purge Method: Sub. pump ~8gpm

Time Completed: 1515
Pump Setting: ~~140' bgs~~ 137'

Total Purge Time: 50 mins
Total Purge Volume: 400 gallons + 60 gallons bailed

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
1158									Begin surge & bail activities
1315									End surge & bail activities
1425									Begin purge
1430	8	112.63	24.8	2310	7.18	360			Cloudy, light brown
1455	8	112.65	24.5	2290	7.10	21			Slightly hazy, Colorless
1505	8	112.66	24.7	2280	7.12	22			Clear, Colorless
1515	8	112.66	24.8	2310	7.11	11			Clear, Colorless

Note: btoc = below top of casing

HYDRO GEO CHEM, INC.
Environmental Science & Technology

Well Development Form

Project Name: Cooper & Commerce WQARF
Project No.: 2010602.60.8.1
Well ID: Mw-119B

Static Depth to Water (feet btoc): ~150' bgs
Total Depth of Well (feet btoc): 615' bgs

Date: 10/1/13
Time Started: 1245
Purge Method: sub. pump

Time Completed: 1700
Pump Setting: 300', 526', 590'

Total Purge Time: 325 minutes
Total Purge Volume: 1950 gallons

Time	Extraction Rate (gpm)	DTW (feet btoc)	Temp (°C)	Conductivity (uS/cm)	pH	Turbidity (NTUs)	ORP (mV)	DO (mg/L)	Notes
									Surge + bail on 9/30/13
1625	~10~6	NA	26.3	2600	6.81	950			Cloudy - light brown
1635		177.8'	26.3	2560	6.85	850			"
1645		177.4	26.1	2520	6.89	500			"
1655		177.5	26.1	2510	6.92	500			slightly cloudy - light brown
1705		177.4	26.0	~~2600~~ 2500	6.93	500			"
1715		177.1	26.0	2480	6.96	380			"
1725		177.2	26.0	2470	7.04	370			"
1735		177.1	26.0	2450	7.05	450			"
1745		176.9	26.0	2460	7.08	380			Hazy - colorless
1815		—	26.0	2450	7.10	340			"
1830		176.6	25.7	2420	7.14	280			"
1845		176.5	25.6	2420	7.14	290			"
1900		176.4	25.6	2400	7.15	340			"

Note: btoc = below top of casing

H:\Field Forms\Well Development Form.xls: WellDevForm

APPENDIX C

IDW INFORMATION

ALLIED WASTE

O/A: **Southwest Re[illegible]nal Landfill**
24427 S. Highway 85
Buckeye, Arizona 85326
Tel: (623) 393-0085
(A Republic Services Operation)

SITE	TICKET	GRID
01	353184	

WEIGHMASTER: KL00039 KATHY L

DATE IN	TIME IN
26 July 2011	10:50 am

DATE OUT	TIME OUT
26 July 2011	11:43 am

VEHICLE	ROLL OFF
GENERIC	

REFERENCE	ORIGIN
9930482	

001099
ENVIRONMENTAL RESPONSE INC.
STACY BOYLES
TEMPE, AZ 85281

Contract: #47551110666

```
00 Gross Weight  60,420.00 lb
   Tare Weight   39,820.00 lb        Inbound - SCALE TICKET
    Net Weight   20,600.00 lb 10.30 TN
```

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
10.30	TN	SW-CONT SOIL				

Manifest:

NET AMOUNT

TENDERED

CHANGE

CHECK NO.

SIGNATURE

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number AZCESQG	2. Page 1 of 1	3. Emergency Response Phone 800-535-5053	4. Waste Tracking Number 19162 D

5. Generator's Name and Mailing Address
AZ Department of Environmental Quality -
1110 W. Washington St.
Phoenix, Az 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Gilbert Bins
905 W. Encinas St.
Gilbert, AZ 85251

6. Transporter 1 Company Name: ENVIRONMENTAL RESPONSE INC
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Southwest Regional Landfill
24427 S Highway 85
Buckeye, AZ 85326
Facility's Phone: 623-393-0085
U.S. EPA ID Number: AZR000042184

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non Regulated Material, (Petroleum Contaminted Soil)	1	CM	2	T
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
1) WP# 4755-11-10666
CD Required ERI# 20-119162

Bin# 66181

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month 07 Day 20 Year 11

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Daniel Olivas
Signature:
Month 7 Day 20 Year 11
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: K Lugo
Signature: K Luen
Month 7 Day 20 Year 11

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

GC Labels • Printed in the USA
1-800-997-6966

TRANSPORTER #1

Reorder Part# MANIFEST-C6NHW
913-897-6966

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. Waste Tracking Number: 19162 ②

GENERATOR

5. Generator's Name and Mailing Address

AZ Department of Environmental Quality -
1110 W. Washington St.
Phoenix, Az 85007

Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)

ADEQ Gilbert Bins
905 W. Encinas St.
Gilbert, AZ 85251

6. Transporter 1 Company Name: ENVIRONMENTAL RESPONSE INC
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address

Southwest Regional Landfill
24427 S Highway 85
Buckeye, AZ 85326

Facility's Phone: 623-393-0095

U.S. EPA ID Number: AZR000042184

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1. Non Regulated Material, (Petroleum Contaminted Soil)	1	CM	7	T	
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information

1) WP# 4755-11-10666
CD Required ERI# 20-119162

Bin # 66185

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Scott [illegible] for ADEQ
Signature:
Month 07 Day 20 Year 11

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Daniel Olivas
Signature:
Month 7 Day 20 Year 11

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: K Lugo
Signature: K Lugo
Month 7 Day 26 Year 11

ALLIED WASTE

O/A: **Southwest Regional Landfill**
24427 S. Highway 85
Buckeye, Arizona 85326
Tel: (623) 393-0085
(A Republic Services Operation)

001099
ENVIRONMENTAL RESPONSE INC.
STACY BOYLES
TEMPE, AZ 85281

Contract: #47551110666

SITE: 01
TICKET: 353188
GRID:
WEIGHMASTER: KL00039 KATHY L
DATE IN: 26 July 2011
TIME IN: 10:52 am
DATE OUT: 26 July 2011
TIME OUT: 12:00 pm
VEHICLE: GENERIC
ROLL OFF:
REFERENCE: #30222
ORIGIN:

```
00 Gross Weight  63,160.00 lb
     Tare Weight  38,520.00 lb          Inbound - SCALE TICKET
      Net Weight  24,640.00 lb 12.32 TN
```

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
12.32	TN	SW-CONT SOIL				

Manifest:

NET AMOUNT:
TENDERED:
CHANGE:
CHECK NO.:

SIGNATURE:

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG

2. Page 1 of 1

3. Emergency Response Phone: 800-535-5053

4. Waste Tracking Number: 19162-3

5. Generator's Name and Mailing Address:
Az Department of Environmental Quality -
1110 W. Washington St.
Phoenix, Az 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address):
ADEQ Gilbert Bins
905 W. Encinas St.
Gilbert, AZ 85251

6. Transporter 1 Company Name: ENVIRONMENTAL RESPONSE INC
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address:
Southwest Regional Landfill
24427 S Highway 85
Buckeye, AZ 85326
Facility's Phone: 623-393-0085
U.S. EPA ID Number: AZR000042184

GENERATOR

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non Regulated Material, (Petroleum Contaminted Soil)	1	CM		T	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
[illegible]
CD Required ERI# 20-119162
BIN#96012

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Scott [illegible] for ADEQ
Signature: Scott [illegible] for ADEQ
Month 07 Day 20 Year 11

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Daniel Olivas M LUCATORTA
Signature: mf 7/26/11
Month 7 Day 20 Year 11

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a.
Printed/Typed Name: K Lugo
Signature: K Lugo
Month 7 Day 26 Year 11

Please print or type
Form designed for use on elite (12-pitch) typewriter

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. Waste Tracking Number: 17162-4

5. Generator's Name and Mailing Address
AZ Department of Environmental Quality -
1110 W. Washington St.
Phoenix, Az 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Gilbert Bins
905 W. Encinas St.
Gilbert, AZ 85251

6. Transporter 1 Company Name: ENVIRONMENTAL RESPONSE INC
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Southwest Regional Landfill
24427 S Highway 85
Buckeye, AZ 85326
Facility's Phone: 623-393-0035
U.S. EPA ID Number: AZR000042184

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non Regulated Material, (Petroleum Contaminted Soil)	1	CM		T	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
1) WP# 4755-11-10666
CD Required ERI# 20-119162
BIN# 96011

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month 07 Day 20 Year 11

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Daniel Olivas MARK LUCATORTA
Signature: M 7/20/11
Month 7 Day 20 Year 11
Transporter 2 Printed/Typed Name:
Signature: Month Day Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: K Lugo
Signature: K Lugo
Month 7 Day 26 Year 11

GENERATOR

4625 East Cotton Center Blvd. Ste 189, Phoenix, AZ 85040 (602) 437-3340 Fax:(602) 454-9303

LABORATORY REPORT

Prepared For: Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project: 2010002.03/T8.1 MW-113
Drilling Waste Disposal

Sampled: 06/24/11
Received: 06/24/11
Issued: 06/30/11 09:04

NELAP #01109CA Arizona DHS#AZ0728

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica. The Chain of Custody, 1 page, is included and is an integral part of this report.
This entire report was reviewed and approved for release.

CASE NARRATIVE

LABORATORY ID	CLIENT ID	MATRIX
PUF1506-01	IDW Roll Off #96011	Soil
PUF1506-02	IDW Roll Off #96012	Soil

SAMPLE RECEIPT:	Samples were received intact, at 1°C, on ice and with chain of custody documentation. Soil samples requiring volatile analysis were received in soil jars.
HOLDING TIMES:	All samples were analyzed within prescribed holding times and/or in accordance with the TestAmerica Sample Acceptance Policy unless otherwise noted in the report.
PRESERVATION:	Samples requiring preservation were verified prior to sample analysis.
QA/QC CRITERIA:	All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS:	No significant observations were made.
SUBCONTRACTED:	No analyses were subcontracted to an outside laboratory.

Reviewed By:

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.	Project ID:	2010002.03/T8.1 MW-113 Drilling Waste Disposal	
6370 East Thomas Road, Suite 200			Sampled: 06/24/11
Scottsdale, AZ 85251-7056	Report Number:	PUF1506	Received: 06/24/11
Attention: Chris Jacquemin			

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Sample ID: PUF1506-01 (IDW Roll Off #96011 - Soil)

Reporting Units: ug/kg

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Acetone	EPA 8260B	11F0890	1000	ND	0.992	6/24/2011	6/28/2011	
Benzene	EPA 8260B	11F0890	50	ND	0.992	6/24/2011	6/28/2011	
Bromobenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Bromochloromethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Bromodichloromethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Bromoform	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Bromomethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
2-Butanone (MEK)	EPA 8260B	11F0890	1000	ND	0.992	6/24/2011	6/28/2011	
n-Butylbenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
sec-Butylbenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
tert-Butylbenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Carbon disulfide	EPA 8260B	11F0890	500	ND	0.992	6/24/2011	6/28/2011	
Carbon tetrachloride	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Chlorobenzene	EPA 8260B	11F0890	50	ND	0.992	6/24/2011	6/28/2011	
Chloroethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Chloroform	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Chloromethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
2-Chlorotoluene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
4-Chlorotoluene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Dibromochloromethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,2-Dibromo-3-chloropropane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,2-Dibromoethane (EDB)	EPA 8260B	11F0890	25	ND	0.992	6/24/2011	6/28/2011	
Dibromomethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,2-Dichlorobenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,3-Dichlorobenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,4-Dichlorobenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Dichlorodifluoromethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,1-Dichloroethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,2-Dichloroethane	EPA 8260B	11F0890	50	ND	0.992	6/24/2011	6/28/2011	
1,1-Dichloroethene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
cis-1,2-Dichloroethene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
trans-1,2-Dichloroethene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,2-Dichloropropane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,3-Dichloropropane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
2,2-Dichloropropane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,1-Dichloropropene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
cis-1,3-Dichloropropene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
trans-1,3-Dichloropropene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Ethylbenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Hexachlorobutadiene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PUF1506-01 (IDW Roll Off #96011 - Soil) - cont.								
Reporting Units: ug/kg								
2-Hexanone	EPA 8260B	11F0890	1000	ND	0.992	6/24/2011	6/28/2011	
Iodomethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Isopropylbenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
p-Isopropyltoluene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Methylene Chloride	EPA 8260B	11F0890	500	ND	0.992	6/24/2011	6/28/2011	
4-Methyl-2-pentanone (MIBK)	EPA 8260B	11F0890	1000	ND	0.992	6/24/2011	6/28/2011	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Naphthalene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
n-Propylbenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Styrene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,1,1,2-Tetrachloroethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,1,2,2-Tetrachloroethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Tetrachloroethene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Toluene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,2,3-Trichlorobenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,2,4-Trichlorobenzene	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,1,1-Trichloroethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,1,2-Trichloroethane	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Trichloroethene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Trichlorofluoromethane	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
1,2,3-Trichloropropane	EPA 8260B	11F0890	500	ND	0.992	6/24/2011	6/28/2011	
1,2,4-Trimethylbenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
1,3,5-Trimethylbenzene	EPA 8260B	11F0890	100	ND	0.992	6/24/2011	6/28/2011	
Vinyl Acetate	EPA 8260B	11F0890	1200	ND	0.992	6/24/2011	6/28/2011	
Vinyl chloride	EPA 8260B	11F0890	250	ND	0.992	6/24/2011	6/28/2011	
Xylenes, Total	EPA 8260B	11F0890	150	ND	0.992	6/24/2011	6/28/2011	
Surrogate: Dibromofluoromethane (57-129%)				*105 %*				
Surrogate: Toluene-d8 (59-134%)				*104 %*				
Surrogate: 4-Bromofluorobenzene (56-127%)				*98 %*				

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03/T8.1 MW-113 Drilling Waste Disposal

Report Number: PUF1506

Sampled: 06/24/11
Received: 06/24/11

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Sample ID: PUF1506-02 (IDW Roll Off #96012 - Soil)

Reporting Units: ug/kg

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Acetone	EPA 8260B	11F0890	1000	ND	1.01	6/24/2011	6/28/2011	
Benzene	EPA 8260B	11F0890	50	ND	1.01	6/24/2011	6/28/2011	
Bromobenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Bromochloromethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Bromodichloromethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Bromoform	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Bromomethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
2-Butanone (MEK)	EPA 8260B	11F0890	1000	ND	1.01	6/24/2011	6/28/2011	
n-Butylbenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
sec-Butylbenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
tert-Butylbenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Carbon disulfide	EPA 8260B	11F0890	500	ND	1.01	6/24/2011	6/28/2011	
Carbon tetrachloride	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Chlorobenzene	EPA 8260B	11F0890	50	ND	1.01	6/24/2011	6/28/2011	
Chloroethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Chloroform	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Chloromethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
2-Chlorotoluene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
4-Chlorotoluene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Dibromochloromethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,2-Dibromo-3-chloropropane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,2-Dibromoethane (EDB)	EPA 8260B	11F0890	25	ND	1.01	6/24/2011	6/28/2011	
Dibromomethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,2-Dichlorobenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,3-Dichlorobenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,4-Dichlorobenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Dichlorodifluoromethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,1-Dichloroethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,2-Dichloroethane	EPA 8260B	11F0890	50	ND	1.01	6/24/2011	6/28/2011	
1,1-Dichloroethene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
cis-1,2-Dichloroethene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
trans-1,2-Dichloroethene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,2-Dichloropropane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,3-Dichloropropane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
2,2-Dichloropropane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,1-Dichloropropene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
cis-1,3-Dichloropropene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
trans-1,3-Dichloropropene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Ethylbenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Hexachlorobutadiene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	

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Project Manager

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PUF1506-02 (IDW Roll Off #96012 - Soil) - cont.								
Reporting Units: ug/kg								
2-Hexanone	EPA 8260B	11F0890	1000	ND	1.01	6/24/2011	6/28/2011	
Iodomethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Isopropylbenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
p-Isopropyltoluene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Methylene Chloride	EPA 8260B	11F0890	500	ND	1.01	6/24/2011	6/28/2011	
4-Methyl-2-pentanone (MIBK)	EPA 8260B	11F0890	1000	ND	1.01	6/24/2011	6/28/2011	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Naphthalene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
n-Propylbenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Styrene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,1,1,2-Tetrachloroethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,1,2,2-Tetrachloroethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Tetrachloroethene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Toluene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,2,3-Trichlorobenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,2,4-Trichlorobenzene	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,1,1-Trichloroethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,1,2-Trichloroethane	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Trichloroethene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Trichlorofluoromethane	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
1,2,3-Trichloropropane	EPA 8260B	11F0890	500	ND	1.01	6/24/2011	6/28/2011	
1,2,4-Trimethylbenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
1,3,5-Trimethylbenzene	EPA 8260B	11F0890	100	ND	1.01	6/24/2011	6/28/2011	
Vinyl Acetate	EPA 8260B	11F0890	1200	ND	1.01	6/24/2011	6/28/2011	
Vinyl chloride	EPA 8260B	11F0890	250	ND	1.01	6/24/2011	6/28/2011	
Xylenes, Total	EPA 8260B	11F0890	150	ND	1.01	6/24/2011	6/28/2011	
Surrogate: Dibromofluoromethane (57-129%)				*87 %*				
Surrogate: Toluene-d8 (59-134%)				*92 %*				
Surrogate: 4-Bromofluorobenzene (56-127%)				*87 %*				

Hydro Geo Chem, Inc.
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Attention: Chris Jacquemin

Project ID: 2010002.03/T8.1 MW-113 Drilling Waste Disposal
Report Number: PUF1506
Sampled: 06/24/11
Received: 06/24/11

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: IDW Roll Off #96011 (PUF1506-01) - Soil					
EPA 8260B	2	06/24/2011 09:00	06/24/2011 13:37	06/24/2011 18:25	06/28/2011 10:18
Sample ID: IDW Roll Off #96012 (PUF1506-02) - Soil					
EPA 8260B	2	06/24/2011 09:15	06/24/2011 13:37	06/24/2011 18:27	06/28/2011 10:50

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Report Number: PUF1506
Sampled: 06/24/11
Received: 06/24/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F0890 Extracted: 06/24/11										
Blank Analyzed: 06/24/2011 (11F0890-BLK1)										
Acetone	ND	1000	ug/kg							
Benzene	ND	50	ug/kg							
Bromobenzene	ND	250	ug/kg							
Bromochloromethane	ND	250	ug/kg							
Bromodichloromethane	ND	100	ug/kg							
Bromoform	ND	250	ug/kg							
Bromomethane	ND	250	ug/kg							
2-Butanone (MEK)	ND	1000	ug/kg							
n-Butylbenzene	ND	250	ug/kg							
sec-Butylbenzene	ND	250	ug/kg							
tert-Butylbenzene	ND	250	ug/kg							
Carbon disulfide	ND	500	ug/kg							
Carbon tetrachloride	ND	250	ug/kg							
Chlorobenzene	ND	50	ug/kg							
Chloroethane	ND	250	ug/kg							
Chloroform	ND	100	ug/kg							
Chloromethane	ND	250	ug/kg							
2-Chlorotoluene	ND	250	ug/kg							
4-Chlorotoluene	ND	250	ug/kg							
Dibromochloromethane	ND	100	ug/kg							
1,2-Dibromo-3-chloropropane	ND	250	ug/kg							
1,2-Dibromoethane (EDB)	ND	25	ug/kg							
Dibromomethane	ND	100	ug/kg							
1,2-Dichlorobenzene	ND	100	ug/kg							
1,3-Dichlorobenzene	ND	100	ug/kg							
1,4-Dichlorobenzene	ND	100	ug/kg							
Dichlorodifluoromethane	ND	250	ug/kg							
1,1-Dichloroethane	ND	100	ug/kg							
1,2-Dichloroethane	ND	50	ug/kg							
1,1-Dichloroethene	ND	250	ug/kg							
cis-1,2-Dichloroethene	ND	100	ug/kg							
trans-1,2-Dichloroethene	ND	100	ug/kg							
1,2-Dichloropropane	ND	100	ug/kg							
1,3-Dichloropropane	ND	100	ug/kg							
2,2-Dichloropropane	ND	100	ug/kg							

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VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F0890 Extracted: 06/24/11										
Blank Analyzed: 06/24/2011 (11F0890-BLK1)										
1,1-Dichloropropene	ND	100	ug/kg							
cis-1,3-Dichloropropene	ND	100	ug/kg							
trans-1,3-Dichloropropene	ND	100	ug/kg							
Ethylbenzene	ND	100	ug/kg							
Hexachlorobutadiene	ND	250	ug/kg							
2-Hexanone	ND	1000	ug/kg							
Iodomethane	ND	250	ug/kg							
Isopropylbenzene	ND	100	ug/kg							
p-Isopropyltoluene	ND	100	ug/kg							
Methylene Chloride	ND	500	ug/kg							
4-Methyl-2-pentanone (MIBK)	ND	1000	ug/kg							
Methyl-tert-butyl Ether (MTBE)	ND	250	ug/kg							
Naphthalene	ND	250	ug/kg							
n-Propylbenzene	ND	100	ug/kg							
Styrene	ND	100	ug/kg							
1,1,1,2-Tetrachloroethane	ND	250	ug/kg							
1,1,2,2-Tetrachloroethane	ND	100	ug/kg							
Tetrachloroethene	ND	100	ug/kg							
Toluene	ND	100	ug/kg							
1,2,3-Trichlorobenzene	ND	250	ug/kg							
1,2,4-Trichlorobenzene	ND	250	ug/kg							
1,1,1-Trichloroethane	ND	100	ug/kg							
1,1,2-Trichloroethane	ND	100	ug/kg							
Trichloroethene	ND	100	ug/kg							
Trichlorofluoromethane	ND	250	ug/kg							
1,2,3-Trichloropropane	ND	500	ug/kg							
1,2,4-Trimethylbenzene	ND	100	ug/kg							
1,3,5-Trimethylbenzene	ND	100	ug/kg							
Vinyl Acetate	ND	1200	ug/kg							
Vinyl chloride	ND	250	ug/kg							
Xylenes, Total	ND	150	ug/kg							
Surrogate: Dibromofluoromethane	*1040*		*ug/kg*	*1260*		*83*	*57-129*			
Surrogate: Toluene-d8	*1100*		*ug/kg*	*1260*		*88*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1110*		*ug/kg*	*1260*		*88*	*56-127*			

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METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F0890 Extracted: 06/24/11										
LCS Analyzed: 06/28/2011 (11F0890-BS1)										
Acetone	1560	1000	ug/kg	1260		124	20-150			
Benzene	1080	50	ug/kg	1260		86	70-130			
Bromobenzene	1210	250	ug/kg	1260		96	70-130			
Bromochloromethane	1170	250	ug/kg	1260		93	70-130			
Bromodichloromethane	1110	100	ug/kg	1260		89	70-130			
Bromoform	1220	250	ug/kg	1260		97	58-108			
Bromomethane	996	250	ug/kg	1260		79	65-116			
2-Butanone (MEK)	1460	1000	ug/kg	1260		117	33-143			
n-Butylbenzene	1250	250	ug/kg	1260		99	70-130			
sec-Butylbenzene	1170	250	ug/kg	1260		94	70-130			
tert-Butylbenzene	1140	250	ug/kg	1260		91	70-130			
Carbon disulfide	1080	500	ug/kg	1260		86	53-119			
Carbon tetrachloride	1030	250	ug/kg	1260		82	68-133			
Chlorobenzene	1130	50	ug/kg	1260		90	70-130			
Chloroethane	1000	250	ug/kg	1260		80	67-120			
Chloroform	1090	100	ug/kg	1260		87	70-130			
Chloromethane	922	250	ug/kg	1260		73	44-121			
2-Chlorotoluene	1120	250	ug/kg	1260		89	70-130			
4-Chlorotoluene	1210	250	ug/kg	1260		96	70-130			
Dibromochloromethane	1170	100	ug/kg	1260		93	70-130			
1,2-Dibromo-3-chloropropane	1340	250	ug/kg	1260		107	55-116			
1,2-Dibromoethane (EDB)	1250	25	ug/kg	1260		100	70-130			
Dibromomethane	1220	100	ug/kg	1260		97	70-130			
1,2-Dichlorobenzene	1310	100	ug/kg	1260		105	70-130			
1,3-Dichlorobenzene	1250	100	ug/kg	1260		100	70-130			
1,4-Dichlorobenzene	1270	100	ug/kg	1260		101	70-130			
Dichlorodifluoromethane	693	250	ug/kg	1260		55	15-117			
1,1-Dichloroethane	1060	100	ug/kg	1260		85	70-130			
1,2-Dichloroethane	1200	50	ug/kg	1260		95	71-139			
1,1-Dichloroethene	970	250	ug/kg	1260		77	70-130			
cis-1,2-Dichloroethene	1090	100	ug/kg	1260		87	70-130			
trans-1,2-Dichloroethene	1060	100	ug/kg	1260		84	70-130			
1,2-Dichloropropane	1130	100	ug/kg	1260		90	70-130			
1,3-Dichloropropane	1170	100	ug/kg	1260		93	70-130			
2,2-Dichloropropane	963	100	ug/kg	1260		77	65-122			

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Sampled: 06/24/11
Received: 06/24/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F0890 Extracted: 06/24/11

LCS Analyzed: 06/28/2011 (11F0890-BS1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	944	100	ug/kg	1260		75	70-130			
cis-1,3-Dichloropropene	1190	100	ug/kg	1260		95	70-130			
trans-1,3-Dichloropropene	1270	100	ug/kg	1260		101	70-130			
Ethylbenzene	1130	100	ug/kg	1260		90	70-130			
Hexachlorobutadiene	1280	250	ug/kg	1260		102	70-130			
2-Hexanone	1250	1000	ug/kg	1260		100	31-136			
Iodomethane	1170	250	ug/kg	1260		94	68-117			
Isopropylbenzene	1180	100	ug/kg	1260		94	70-130			
p-Isopropyltoluene	1200	100	ug/kg	1260		95	70-130			
Methylene Chloride	1050	500	ug/kg	1260		84	70-130			
4-Methyl-2-pentanone (MIBK)	1310	1000	ug/kg	1260		104	59-124			
Methyl-tert-butyl Ether (MTBE)	1430	250	ug/kg	1260		114	69-132			
Naphthalene	1320	250	ug/kg	1260		105	64-112			
n-Propylbenzene	1200	100	ug/kg	1260		96	70-130			
Styrene	1060	100	ug/kg	1260		85	70-130			
1,1,1,2-Tetrachloroethane	1110	250	ug/kg	1260		89	70-130			
1,1,2,2-Tetrachloroethane	1310	100	ug/kg	1260		105	63-129			
Tetrachloroethene	1040	100	ug/kg	1260		83	70-130			
Toluene	1120	100	ug/kg	1260		89	70-130			
1,2,3-Trichlorobenzene	1550	250	ug/kg	1260		123	70-130			
1,2,4-Trichlorobenzene	1300	250	ug/kg	1260		104	66-124			
1,1,1-Trichloroethane	997	100	ug/kg	1260		79	70-130			
1,1,2-Trichloroethane	1260	100	ug/kg	1260		100	70-130			
Trichloroethene	1070	100	ug/kg	1260		85	70-130			
Trichlorofluoromethane	1070	250	ug/kg	1260		85	72-143			
1,2,3-Trichloropropane	1140	500	ug/kg	1260		91	64-125			
1,2,4-Trimethylbenzene	1180	100	ug/kg	1260		94	66-124			
1,3,5-Trimethylbenzene	1160	100	ug/kg	1260		92	70-130			
Vinyl Acetate	1110	1200	ug/kg	1260		88	46-150			
Vinyl chloride	465	250	ug/kg	1260		37	10-118			
Xylenes, Total	2200	150	ug/kg	2510		88	70-130			
Surrogate: Dibromofluoromethane	*1150*		*ug/kg*	*1260*		*91*	*70-130*			
Surrogate: Toluene-d8	*1190*		*ug/kg*	*1260*		*95*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1210*		*ug/kg*	*1260*		*96*	*70-130*			

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F0890 Extracted: 06/24/11

LCS Dup Analyzed: 06/28/2011 (11F0890-BSD1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Acetone	1200	1000	ug/kg	1240		97	20-150	26	50	
Benzene	1090	50	ug/kg	1240		88	70-130	1	33	
Bromobenzene	1230	250	ug/kg	1240		99	70-130	1	28	
Bromochloromethane	1170	250	ug/kg	1240		95	70-130	0.7	37	
Bromodichloromethane	1160	100	ug/kg	1240		94	70-130	4	34	
Bromoform	1260	250	ug/kg	1240		102	58-108	3	35	
Bromomethane	974	250	ug/kg	1240		79	65-116	2	33	
2-Butanone (MEK)	1170	1000	ug/kg	1240		95	33-143	22	53	
n-Butylbenzene	1360	250	ug/kg	1240		110	70-130	9	27	
sec-Butylbenzene	1230	250	ug/kg	1240		99	70-130	5	28	
tert-Butylbenzene	1210	250	ug/kg	1240		98	70-130	6	27	
Carbon disulfide	1080	500	ug/kg	1240		87	53-119	0.8	35	
Carbon tetrachloride	1030	250	ug/kg	1240		83	68-133	0.2	32	
Chlorobenzene	1170	50	ug/kg	1240		94	70-130	3	29	
Chloroethane	1000	250	ug/kg	1240		81	67-120	0.2	32	
Chloroform	1070	100	ug/kg	1240		87	70-130	2	33	
Chloromethane	920	250	ug/kg	1240		74	44-121	0.2	36	
2-Chlorotoluene	1180	250	ug/kg	1240		95	70-130	5	27	
4-Chlorotoluene	1280	250	ug/kg	1240		103	70-130	6	28	
Dibromochloromethane	1190	100	ug/kg	1240		97	70-130	2	35	
1,2-Dibromo-3-chloropropane	1180	250	ug/kg	1240		95	55-116	13	42	
1,2-Dibromoethane (EDB)	1230	25	ug/kg	1240		99	70-130	2	36	
Dibromomethane	1160	100	ug/kg	1240		94	70-130	4	37	
1,2-Dichlorobenzene	1360	100	ug/kg	1240		110	70-130	3	28	
1,3-Dichlorobenzene	1340	100	ug/kg	1240		108	70-130	6	27	
1,4-Dichlorobenzene	1310	100	ug/kg	1240		106	70-130	4	27	
Dichlorodifluoromethane	713	250	ug/kg	1240		58	15-117	3	39	
1,1-Dichloroethane	1060	100	ug/kg	1240		86	70-130	0.4	33	
1,2-Dichloroethane	1170	50	ug/kg	1240		95	71-139	2	37	
1,1-Dichloroethene	988	250	ug/kg	1240		80	70-130	2	31	
cis-1,2-Dichloroethene	1070	100	ug/kg	1240		87	70-130	1	35	
trans-1,2-Dichloroethene	1070	100	ug/kg	1240		86	70-130	0.8	31	
1,2-Dichloropropane	1160	100	ug/kg	1240		94	70-130	3	31	
1,3-Dichloropropane	1210	100	ug/kg	1240		98	70-130	4	32	
2,2-Dichloropropane	967	100	ug/kg	1240		78	65-122	0.4	31	

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METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F0890 Extracted: 06/24/11										
LCS Dup Analyzed: 06/28/2011 (11F0890-BSD1)										
1,1-Dichloropropene	971	100	ug/kg	1240		78	70-130	3	30	
cis-1,3-Dichloropropene	1240	100	ug/kg	1240		100	70-130	4	35	
trans-1,3-Dichloropropene	1270	100	ug/kg	1240		103	70-130	0.2	37	
Ethylbenzene	1150	100	ug/kg	1240		93	70-130	2	28	
Hexachlorobutadiene	1360	250	ug/kg	1240		110	70-130	7	31	
2-Hexanone	1120	1000	ug/kg	1240		91	31-136	11	48	
Iodomethane	1190	250	ug/kg	1240		97	68-117	2	32	
Isopropylbenzene	1230	100	ug/kg	1240		99	70-130	4	27	
p-Isopropyltoluene	1250	100	ug/kg	1240		101	70-130	5	30	
Methylene Chloride	1000	500	ug/kg	1240		81	70-130	5	38	
4-Methyl-2-pentanone (MIBK)	1210	1000	ug/kg	1240		98	59-124	7	51	
Methyl-tert-butyl Ether (MTBE)	1360	250	ug/kg	1240		110	69-132	5	46	
Naphthalene	1360	250	ug/kg	1240		110	64-112	3	38	
n-Propylbenzene	1260	100	ug/kg	1240		102	70-130	5	29	
Styrene	1110	100	ug/kg	1240		90	70-130	5	30	
1,1,1,2-Tetrachloroethane	1210	250	ug/kg	1240		97	70-130	8	32	
1,1,2,2-Tetrachloroethane	1290	100	ug/kg	1240		104	63-129	2	38	
Tetrachloroethene	1060	100	ug/kg	1240		85	70-130	2	26	
Toluene	1140	100	ug/kg	1240		92	70-130	2	31	
1,2,3-Trichlorobenzene	1580	250	ug/kg	1240		128	70-130	2	35	
1,2,4-Trichlorobenzene	1350	250	ug/kg	1240		109	66-124	4	31	
1,1,1-Trichloroethane	1020	100	ug/kg	1240		83	70-130	3	32	
1,1,2-Trichloroethane	1270	100	ug/kg	1240		102	70-130	0.7	39	
Trichloroethene	1100	100	ug/kg	1240		89	70-130	3	29	
Trichlorofluoromethane	1070	250	ug/kg	1240		87	72-143	0.2	37	
1,2,3-Trichloropropane	1140	500	ug/kg	1240		92	64-125	0.4	39	
1,2,4-Trimethylbenzene	1240	100	ug/kg	1240		100	66-124	5	31	
1,3,5-Trimethylbenzene	1240	100	ug/kg	1240		100	70-130	7	27	
Vinyl Acetate	974	1200	ug/kg	1240		79	46-150	13	50	
Vinyl chloride	471	250	ug/kg	1240		38	10-118	1	65	
Xylenes, Total	2320	150	ug/kg	2480		94	70-130	5	32	
Surrogate: Dibromofluoromethane	*1110*		*ug/kg*	*1240*		*89*	*70-130*			
Surrogate: Toluene-d8	*1160*		*ug/kg*	*1240*		*94*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1170*		*ug/kg*	*1240*		*94*	*70-130*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03/T8.1 MW-113 Drilling Waste Disposal
Report Number: PUF1506

Sampled: 06/24/11
Received: 06/24/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F0890 Extracted: 06/24/11

Matrix Spike Analyzed: 06/24/2011 (11F0890-MS1) **Source: PUF1475-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Acetone	1200	1000	ug/kg	1260	ND	95	16-149			
Benzene	1160	50	ug/kg	1260	ND	92	55-123			
Bromobenzene	1410	250	ug/kg	1260	ND	112	59-129			
Bromochloromethane	1020	250	ug/kg	1260	ND	81	56-129			
Bromodichloromethane	1200	100	ug/kg	1260	ND	95	60-124			
Bromoform	1160	250	ug/kg	1260	ND	92	51-109			
Bromomethane	1090	250	ug/kg	1260	ND	86	39-123			
2-Butanone (MEK)	971	1000	ug/kg	1260	ND	77	35-126			
n-Butylbenzene	1320	250	ug/kg	1260	ND	104	41-150			
sec-Butylbenzene	1470	250	ug/kg	1260	ND	116	40-146			
tert-Butylbenzene	1530	250	ug/kg	1260	ND	121	49-138			
Carbon disulfide	1130	500	ug/kg	1260	ND	90	20-127			
Carbon tetrachloride	1340	250	ug/kg	1260	ND	106	45-140			
Chlorobenzene	1300	50	ug/kg	1260	ND	103	61-123			
Chloroethane	1190	250	ug/kg	1260	ND	94	44-125			
Chloroform	1190	100	ug/kg	1260	ND	94	57-131			
Chloromethane	1080	250	ug/kg	1260	ND	86	28-119			
2-Chlorotoluene	1350	250	ug/kg	1260	ND	107	52-136			
4-Chlorotoluene	1390	250	ug/kg	1260	ND	110	56-136			
Dibromochloromethane	1200	100	ug/kg	1260	ND	95	59-117			
1,2-Dibromo-3-chloropropane	1130	250	ug/kg	1260	ND	90	44-121			
1,2-Dibromoethane (EDB)	1170	25	ug/kg	1260	ND	93	62-119			
Dibromomethane	1120	100	ug/kg	1260	ND	89	57-124			
1,2-Dichlorobenzene	1340	100	ug/kg	1260	ND	106	54-130			
1,3-Dichlorobenzene	1410	100	ug/kg	1260	ND	112	53-132			
1,4-Dichlorobenzene	1360	100	ug/kg	1260	ND	108	55-132			
Dichlorodifluoromethane	871	250	ug/kg	1260	ND	69	10-96			
1,1-Dichloroethane	1140	100	ug/kg	1260	ND	90	57-132			
1,2-Dichloroethane	1170	50	ug/kg	1260	ND	93	52-138			
1,1-Dichloroethene	1080	250	ug/kg	1260	ND	86	50-131			
cis-1,2-Dichloroethene	1110	100	ug/kg	1260	ND	88	58-118			
trans-1,2-Dichloroethene	1140	100	ug/kg	1260	ND	91	57-128			
1,2-Dichloropropane	1150	100	ug/kg	1260	ND	91	61-124			
1,3-Dichloropropane	1070	100	ug/kg	1260	ND	85	63-116			
2,2-Dichloropropane	1330	100	ug/kg	1260	ND	105	50-123			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F0890 Extracted: 06/24/11

Matrix Spike Analyzed: 06/24/2011 (11F0890-MS1) **Source: PUF1475-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	1230	100	ug/kg	1260	ND	97	52-129			
cis-1,3-Dichloropropene	1100	100	ug/kg	1260	ND	87	50-139			
trans-1,3-Dichloropropene	1170	100	ug/kg	1260	ND	93	45-132			
Ethylbenzene	1390	100	ug/kg	1260	ND	110	54-133			
Hexachlorobutadiene	1560	250	ug/kg	1260	ND	123	10-150			
2-Hexanone	1280	1000	ug/kg	1260	ND	102	30-115			
Iodomethane	1210	250	ug/kg	1260	ND	96	42-125			
Isopropylbenzene	1570	100	ug/kg	1260	ND	124	60-144			
p-Isopropyltoluene	1510	100	ug/kg	1260	ND	119	44-140			
Methylene Chloride	1010	500	ug/kg	1260	ND	80	52-132			
4-Methyl-2-pentanone (MIBK)	1080	1000	ug/kg	1260	ND	85	50-124			
Methyl-tert-butyl Ether (MTBE)	1040	250	ug/kg	1260	ND	82	56-128			
Naphthalene	856	250	ug/kg	1260	ND	68	35-128			
n-Propylbenzene	1570	100	ug/kg	1260	ND	124	50-148			
Styrene	1030	100	ug/kg	1260	ND	82	45-122			
1,1,1,2-Tetrachloroethane	1310	250	ug/kg	1260	ND	104	63-120			
1,1,2,2-Tetrachloroethane	1250	100	ug/kg	1260	ND	99	44-139			
Tetrachloroethene	1410	100	ug/kg	1260	ND	111	47-138			
Toluene	1230	100	ug/kg	1260	ND	97	59-129			
1,2,3-Trichlorobenzene	954	250	ug/kg	1260	ND	76	32-137			
1,2,4-Trichlorobenzene	1140	250	ug/kg	1260	ND	90	28-139			
1,1,1-Trichloroethane	1340	100	ug/kg	1260	ND	106	53-133			
1,1,2-Trichloroethane	1120	100	ug/kg	1260	ND	89	57-118			
Trichloroethene	1210	100	ug/kg	1260	ND	96	56-136			
Trichlorofluoromethane	1470	250	ug/kg	1260	ND	116	41-148			
1,2,3-Trichloropropane	1220	500	ug/kg	1260	ND	97	56-131			
1,2,4-Trimethylbenzene	1460	100	ug/kg	1260	ND	116	28-139			
1,3,5-Trimethylbenzene	1450	100	ug/kg	1260	ND	115	48-146			
Vinyl Acetate	861	1200	ug/kg	1260	ND	68	10-150			
Vinyl chloride	914	250	ug/kg	1260	ND	72	12-97			
Xylenes, Total	2690	150	ug/kg	2530	ND	106	57-122			
Surrogate: Dibromofluoromethane	*998*		*ug/kg*	*1260*		*79*	*57-129*			
Surrogate: Toluene-d8	*1040*		*ug/kg*	*1260*		*82*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1060*		*ug/kg*	*1260*		*84*	*56-127*			

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F0890 Extracted: 06/24/11										
Matrix Spike Dup Analyzed: 06/24/2011 (11F0890-MSD1)					**Source: PUF1475-01**					
Acetone	1110	1000	ug/kg	1250	ND	89	16-149	7	40	
Benzene	1160	50	ug/kg	1250	ND	93	55-123	0.08	20	
Bromobenzene	1360	250	ug/kg	1250	ND	109	59-129	4	23	
Bromochloromethane	1090	250	ug/kg	1250	ND	87	56-129	7	31	
Bromodichloromethane	1190	100	ug/kg	1250	ND	95	60-124	0.5	24	
Bromoform	1180	250	ug/kg	1250	ND	95	51-109	2	27	
Bromomethane	1080	250	ug/kg	1250	ND	86	39-123	1	35	
2-Butanone (MEK)	1120	1000	ug/kg	1250	ND	90	35-126	15	39	
n-Butylbenzene	1270	250	ug/kg	1250	ND	101	41-150	4	28	
sec-Butylbenzene	1400	250	ug/kg	1250	ND	112	40-146	5	30	
tert-Butylbenzene	1400	250	ug/kg	1250	ND	112	49-138	9	29	
Carbon disulfide	1070	500	ug/kg	1250	ND	86	20-127	6	32	
Carbon tetrachloride	1320	250	ug/kg	1250	ND	106	45-140	1	23	
Chlorobenzene	1300	50	ug/kg	1250	ND	104	61-123	0.3	21	
Chloroethane	1130	250	ug/kg	1250	ND	90	44-125	5	32	
Chloroform	1180	100	ug/kg	1250	ND	94	57-131	0.9	27	
Chloromethane	982	250	ug/kg	1250	ND	79	28-119	10	40	
2-Chlorotoluene	1290	250	ug/kg	1250	ND	104	52-136	4	23	
4-Chlorotoluene	1330	250	ug/kg	1250	ND	106	56-136	5	21	
Dibromochloromethane	1230	100	ug/kg	1250	ND	98	59-117	2	23	
1,2-Dibromo-3-chloropropane	1260	250	ug/kg	1250	ND	101	44-121	11	34	
1,2-Dibromoethane (EDB)	1230	25	ug/kg	1250	ND	99	62-119	5	24	
Dibromomethane	1180	100	ug/kg	1250	ND	95	57-124	5	26	
1,2-Dichlorobenzene	1340	100	ug/kg	1250	ND	107	54-130	0.08	23	
1,3-Dichlorobenzene	1400	100	ug/kg	1250	ND	112	53-132	1	23	
1,4-Dichlorobenzene	1340	100	ug/kg	1250	ND	107	55-132	1	22	
Dichlorodifluoromethane	832	250	ug/kg	1250	ND	67	10-96	5	25	
1,1-Dichloroethane	1080	100	ug/kg	1250	ND	86	57-132	5	26	
1,2-Dichloroethane	1160	50	ug/kg	1250	ND	93	52-138	0.7	30	
1,1-Dichloroethene	1080	250	ug/kg	1250	ND	86	50-131	0.07	32	
cis-1,2-Dichloroethene	1040	100	ug/kg	1250	ND	84	58-118	6	24	
trans-1,2-Dichloroethene	1090	100	ug/kg	1250	ND	87	57-128	5	27	
1,2-Dichloropropane	1180	100	ug/kg	1250	ND	95	61-124	3	21	
1,3-Dichloropropane	1100	100	ug/kg	1250	ND	88	63-116	3	21	
2,2-Dichloropropane	1210	100	ug/kg	1250	ND	97	50-123	9	26	

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F0890 Extracted: 06/24/11

Matrix Spike Dup Analyzed: 06/24/2011 (11F0890-MSD1) **Source: PUF1475-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	1200	100	ug/kg	1250	ND	96	52-129	2	21	
cis-1,3-Dichloropropene	1120	100	ug/kg	1250	ND	90	50-139	2	25	
trans-1,3-Dichloropropene	1270	100	ug/kg	1250	ND	101	45-132	8	26	
Ethylbenzene	1360	100	ug/kg	1250	ND	109	54-133	2	27	
Hexachlorobutadiene	1490	250	ug/kg	1250	ND	119	10-150	5	34	
2-Hexanone	1270	1000	ug/kg	1250	ND	101	30-115	1	36	
Iodomethane	1120	250	ug/kg	1250	ND	90	42-125	8	30	
Isopropylbenzene	1500	100	ug/kg	1250	ND	120	60-144	4	29	
p-Isopropyltoluene	1510	100	ug/kg	1250	ND	121	44-140	0.2	30	
Methylene Chloride	940	500	ug/kg	1250	ND	75	52-132	7	30	
4-Methyl-2-pentanone (MIBK)	1140	1000	ug/kg	1250	ND	91	50-124	6	29	
Methyl-tert-butyl Ether (MTBE)	991	250	ug/kg	1250	ND	79	56-128	5	32	
Naphthalene	902	250	ug/kg	1250	ND	72	35-128	5	30	
n-Propylbenzene	1470	100	ug/kg	1250	ND	118	50-148	6	29	
Styrene	1000	100	ug/kg	1250	ND	80	45-122	3	22	
1,1,1,2-Tetrachloroethane	1330	250	ug/kg	1250	ND	106	63-120	1	21	
1,1,2,2-Tetrachloroethane	1220	100	ug/kg	1250	ND	97	44-139	3	40	
Tetrachloroethene	1350	100	ug/kg	1250	ND	108	47-138	4	31	
Toluene	1220	100	ug/kg	1250	ND	98	59-129	0.4	20	
1,2,3-Trichlorobenzene	936	250	ug/kg	1250	ND	75	32-137	2	30	
1,2,4-Trichlorobenzene	1130	250	ug/kg	1250	ND	90	28-139	0.5	26	
1,1,1-Trichloroethane	1250	100	ug/kg	1250	ND	100	53-133	7	25	
1,1,2-Trichloroethane	1180	100	ug/kg	1250	ND	95	57-118	5	29	
Trichloroethene	1230	100	ug/kg	1250	ND	98	56-136	1	26	
Trichlorofluoromethane	1380	250	ug/kg	1250	ND	110	41-148	6	27	
1,2,3-Trichloropropane	1120	500	ug/kg	1250	ND	90	56-131	8	24	
1,2,4-Trimethylbenzene	1380	100	ug/kg	1250	ND	111	28-139	5	26	
1,3,5-Trimethylbenzene	1400	100	ug/kg	1250	ND	112	48-146	4	35	
Vinyl Acetate	845	1200	ug/kg	1250	ND	68	10-150	2	40	
Vinyl chloride	840	250	ug/kg	1250	ND	67	12-97	8	40	
Xylenes, Total	2550	150	ug/kg	2500	ND	102	57-122	5	22	
Surrogate: Dibromofluoromethane	*1000*		*ug/kg*	*1250*		*80*	*57-129*			
Surrogate: Toluene-d8	*1070*		*ug/kg*	*1250*		*85*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1160*		*ug/kg*	*1250*		*93*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc. 6370 East Thomas Road, Suite 200 Scottsdale, AZ 85251-7056 Attention: Chris Jacquemin	Project ID: 2010002.03/T8.1 MW-113 Drilling Waste Disposal Report Number: PUF1506	Sampled: 06/24/11 Received: 06/24/11

DATA QUALIFIERS AND DEFINITIONS

ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

TestAmerica Phoenix

Linda Eshelman
Project Manager

Certification Summary

TestAmerica Phoenix

Method	Matrix	Nelac	Arizona
EPA 8260B	Soil	X	X

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

TestAmerica Phoenix

Linda Eshelman
Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-0013-550 (10/10)

CHAIN OF CUSTODY FORM

[ ] Phoenix - 4625 E. Cotton Center Blvd., Suite 189, Phoenix, AZ 85040 (602) 437-3340 FAX (602) 454-9303
[ ] Tucson - 1870 W. Prince Road, Suite 59, Tucson, AZ 85705 (520) 807-3801 FAX (520) 807-3803
[ ] Las Vegas - 6000 S Eastern Ave., Suite 5E, Las Vegas, NV 89119 (702) 429-1264

Page 1 of 1

Client Name / Address:
HydroGeoChem, Inc.
6370 E. Thomas Rd, Suite 200
Scottsdale, AZ 85251

Project / PO Number:
2010002.03 / T8.1
UW-113 Drilling Waste Disposal

Project Manager:
Chris Jacquemin

Sampler: N.J. Babb

Phone Number:
(480) 421-1501 x145

Fax Number:
(480) 425-8794

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Analysis Required									1UF1506 Special Instructions
							Method 8260B									
IDW RollOff # 96011	Soil	8oz Jar	1	6-24-11	9:00	—	X									-01
IDW RollOff # 96012	Soil	8oz Jar	1	6-24-11	9:15	—	X									-02
Temp Blank																

Relinquished By:	Date / Time:	Received By:	Date / Time:
	6-24-11 / 10:15		6-24-11 / 10:15
	6-24-11 / 13:37		
		Received in Lab By:	6/24/11 13:37

Turnaround Time: (Check)
same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ normal X

Sample Integrity: (Check)
intact ✓ on ice ✓

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

CS 0.8°C

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
4625 East Cotton Center Blvd. Ste 189, Phoenix, AZ 85040 (602) 437-3340 Fax:(602) 454-9303

LABORATORY REPORT

Prepared For: Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project: 2010002.03, T8.1 Coop + Comm
MW-113 Install

Sampled: 06/27/11
Received: 06/27/11
Issued: 06/30/11 09:25

NELAP #01109CA Arizona DHS#AZ0728

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica. The Chain of Custody, 1 page, is included and is an integral part of this report.
This entire report was reviewed and approved for release.

CASE NARRATIVE

LABORATORY ID	CLIENT ID	MATRIX
PUF1569-01	IDW Roll off #66181	Soil

SAMPLE RECEIPT:	Samples were received intact, at 4°C, on ice and with chain of custody documentation. Soil samples requiring volatile analysis were received in soil jars.
HOLDING TIMES:	All samples were analyzed within prescribed holding times and/or in accordance with the TestAmerica Sample Acceptance Policy unless otherwise noted in the report.
PRESERVATION:	Samples requiring preservation were verified prior to sample analysis.
QA/QC CRITERIA:	All analyses met method criteria, except as noted in the report with data qualifiers. L3 - 8260 - Batch 11F1002 / PUF1569-01 - Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits for several analytes. Analyte not detected, data not impacted.
COMMENTS:	No significant observations were made.
SUBCONTRACTED:	No analyses were subcontracted to an outside laboratory.

Reviewed By:

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install
Report Number: PUF1569

Sampled: 06/27/11
Received: 06/27/11

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PUF1569-01 (IDW Roll off #66181 - Soil)								
Reporting Units: ug/kg								
Acetone	EPA 8260B	11F1002	1000	ND	0.996	6/28/2011	6/28/2011	
Benzene	EPA 8260B	11F1002	50	ND	0.996	6/28/2011	6/28/2011	
Bromobenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Bromochloromethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Bromodichloromethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Bromoform	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Bromomethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
2-Butanone (MEK)	EPA 8260B	11F1002	1000	ND	0.996	6/28/2011	6/28/2011	L3
n-Butylbenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
sec-Butylbenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
tert-Butylbenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Carbon disulfide	EPA 8260B	11F1002	500	ND	0.996	6/28/2011	6/28/2011	
Carbon tetrachloride	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Chlorobenzene	EPA 8260B	11F1002	50	ND	0.996	6/28/2011	6/28/2011	
Chloroethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Chloroform	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Chloromethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
2-Chlorotoluene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
4-Chlorotoluene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Dibromochloromethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,2-Dibromo-3-chloropropane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
1,2-Dibromoethane (EDB)	EPA 8260B	11F1002	25	ND	0.996	6/28/2011	6/28/2011	
Dibromomethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,2-Dichlorobenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,3-Dichlorobenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,4-Dichlorobenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Dichlorodifluoromethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
1,1-Dichloroethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,2-Dichloroethane	EPA 8260B	11F1002	50	ND	0.996	6/28/2011	6/28/2011	
1,1-Dichloroethene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
cis-1,2-Dichloroethene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
trans-1,2-Dichloroethene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,2-Dichloropropane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,3-Dichloropropane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
2,2-Dichloropropane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,1-Dichloropropene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
cis-1,3-Dichloropropene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
trans-1,3-Dichloropropene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Ethylbenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Hexachlorobutadiene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	L3

TestAmerica Phoenix

Linda Eshelman
Project Manager

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PUF1569-01 (IDW Roll off #66181 - Soil) - cont.								
Reporting Units: ug/kg								
2-Hexanone	EPA 8260B	11F1002	1000	ND	0.996	6/28/2011	6/28/2011	L3
Iodomethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Isopropylbenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
p-Isopropyltoluene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Methylene Chloride	EPA 8260B	11F1002	500	ND	0.996	6/28/2011	6/28/2011	
4-Methyl-2-pentanone (MIBK)	EPA 8260B	11F1002	1000	ND	0.996	6/28/2011	6/28/2011	L3
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Naphthalene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	L3
n-Propylbenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Styrene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,1,1,2-Tetrachloroethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
1,1,2,2-Tetrachloroethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Tetrachloroethene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Toluene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,2,3-Trichlorobenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
1,2,4-Trichlorobenzene	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	L3
1,1,1-Trichloroethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,1,2-Trichloroethane	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Trichloroethene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Trichlorofluoromethane	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
1,2,3-Trichloropropane	EPA 8260B	11F1002	500	ND	0.996	6/28/2011	6/28/2011	
1,2,4-Trimethylbenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
1,3,5-Trimethylbenzene	EPA 8260B	11F1002	100	ND	0.996	6/28/2011	6/28/2011	
Vinyl Acetate	EPA 8260B	11F1002	1200	ND	0.996	6/28/2011	6/28/2011	
Vinyl chloride	EPA 8260B	11F1002	250	ND	0.996	6/28/2011	6/28/2011	
Xylenes, Total	EPA 8260B	11F1002	150	ND	0.996	6/28/2011	6/28/2011	
Surrogate: Dibromofluoromethane (57-129%)				*97 %*				
Surrogate: Toluene-d8 (59-134%)				*94 %*				
Surrogate: 4-Bromofluorobenzene (56-127%)				*87 %*				

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install
Report Number: PUF1569
Sampled: 06/27/11
Received: 06/27/11

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: IDW Roll off #66181 (PUF1569-01) - Soil					
EPA 8260B	2	06/27/2011 08:00	06/27/2011 13:52	06/28/2011 09:50	06/28/2011 16:46

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F1002 Extracted: 06/28/11										
Blank Analyzed: 06/28/2011 (11F1002-BLK1)										
Acetone	ND	1000	ug/kg							
Benzene	ND	50	ug/kg							
Bromobenzene	ND	250	ug/kg							
Bromochloromethane	ND	250	ug/kg							
Bromodichloromethane	ND	100	ug/kg							
Bromoform	ND	250	ug/kg							
Bromomethane	ND	250	ug/kg							
2-Butanone (MEK)	ND	1000	ug/kg							
n-Butylbenzene	ND	250	ug/kg							
sec-Butylbenzene	ND	250	ug/kg							
tert-Butylbenzene	ND	250	ug/kg							
Carbon disulfide	ND	500	ug/kg							
Carbon tetrachloride	ND	250	ug/kg							
Chlorobenzene	ND	50	ug/kg							
Chloroethane	ND	250	ug/kg							
Chloroform	ND	100	ug/kg							
Chloromethane	ND	250	ug/kg							
2-Chlorotoluene	ND	250	ug/kg							
4-Chlorotoluene	ND	250	ug/kg							
Dibromochloromethane	ND	100	ug/kg							
1,2-Dibromo-3-chloropropane	ND	250	ug/kg							
1,2-Dibromoethane (EDB)	ND	25	ug/kg							
Dibromomethane	ND	100	ug/kg							
1,2-Dichlorobenzene	ND	100	ug/kg							
1,3-Dichlorobenzene	ND	100	ug/kg							
1,4-Dichlorobenzene	ND	100	ug/kg							
Dichlorodifluoromethane	ND	250	ug/kg							
1,1-Dichloroethane	ND	100	ug/kg							
1,2-Dichloroethane	ND	50	ug/kg							
1,1-Dichloroethene	ND	250	ug/kg							
cis-1,2-Dichloroethene	ND	100	ug/kg							
trans-1,2-Dichloroethene	ND	100	ug/kg							
1,2-Dichloropropane	ND	100	ug/kg							
1,3-Dichloropropane	ND	100	ug/kg							
2,2-Dichloropropane	ND	100	ug/kg							

Hydro Geo Chem, Inc. 6370 East Thomas Road, Suite 200 Scottsdale, AZ 85251-7056 Attention: Chris Jacquemin	Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install	Sampled: 06/27/11	
	Report Number: PUF1569	Received: 06/27/11	

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F1002 Extracted: 06/28/11										
Blank Analyzed: 06/28/2011 (11F1002-BLK1)										
1,1-Dichloropropene	ND	100	ug/kg							
cis-1,3-Dichloropropene	ND	100	ug/kg							
trans-1,3-Dichloropropene	ND	100	ug/kg							
Ethylbenzene	ND	100	ug/kg							
Hexachlorobutadiene	ND	250	ug/kg							
2-Hexanone	ND	1000	ug/kg							
Iodomethane	ND	250	ug/kg							
Isopropylbenzene	ND	100	ug/kg							
p-Isopropyltoluene	ND	100	ug/kg							
Methylene Chloride	ND	500	ug/kg							
4-Methyl-2-pentanone (MIBK)	ND	1000	ug/kg							
Methyl-tert-butyl Ether (MTBE)	ND	250	ug/kg							
Naphthalene	ND	250	ug/kg							
n-Propylbenzene	ND	100	ug/kg							
Styrene	ND	100	ug/kg							
1,1,1,2-Tetrachloroethane	ND	250	ug/kg							
1,1,2,2-Tetrachloroethane	ND	100	ug/kg							
Tetrachloroethene	ND	100	ug/kg							
Toluene	ND	100	ug/kg							
1,2,3-Trichlorobenzene	ND	250	ug/kg							
1,2,4-Trichlorobenzene	ND	250	ug/kg							
1,1,1-Trichloroethane	ND	100	ug/kg							
1,1,2-Trichloroethane	ND	100	ug/kg							
Trichloroethene	ND	100	ug/kg							
Trichlorofluoromethane	ND	250	ug/kg							
1,2,3-Trichloropropane	ND	500	ug/kg							
1,2,4-Trimethylbenzene	ND	100	ug/kg							
1,3,5-Trimethylbenzene	ND	100	ug/kg							
Vinyl Acetate	ND	1200	ug/kg							
Vinyl chloride	ND	250	ug/kg							
Xylenes, Total	ND	150	ug/kg							
Surrogate: Dibromofluoromethane	*1330*		*ug/kg*	*1250*		*107*	*57-129*			
Surrogate: Toluene-d8	*1330*		*ug/kg*	*1250*		*107*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1280*		*ug/kg*	*1250*		*102*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F1002 Extracted: 06/28/11										
LCS Analyzed: 06/28/2011 (11F1002-BS1)										
Acetone	1790	1000	ug/kg	1250		144	20-150			
Benzene	1150	50	ug/kg	1250		92	70-130			
Bromobenzene	1280	250	ug/kg	1250		102	70-130			
Bromochloromethane	1270	250	ug/kg	1250		102	70-130			
Bromodichloromethane	1350	100	ug/kg	1250		108	70-130			
Bromoform	1240	250	ug/kg	1250		99	58-108			
Bromomethane	1140	250	ug/kg	1250		91	65-116			
2-Butanone (MEK)	1940	1000	ug/kg	1250		155	33-143			*L3*
n-Butylbenzene	1410	250	ug/kg	1250		113	70-130			
sec-Butylbenzene	1360	250	ug/kg	1250		109	70-130			
tert-Butylbenzene	1310	250	ug/kg	1250		104	70-130			
Carbon disulfide	1110	500	ug/kg	1250		89	53-119			
Carbon tetrachloride	1160	250	ug/kg	1250		93	68-133			
Chlorobenzene	1340	50	ug/kg	1250		108	70-130			
Chloroethane	1110	250	ug/kg	1250		89	67-120			
Chloroform	1190	100	ug/kg	1250		95	70-130			
Chloromethane	958	250	ug/kg	1250		77	44-121			
2-Chlorotoluene	1200	250	ug/kg	1250		96	70-130			
4-Chlorotoluene	1230	250	ug/kg	1250		99	70-130			
Dibromochloromethane	1300	100	ug/kg	1250		104	70-130			
1,2-Dibromo-3-chloropropane	1280	250	ug/kg	1250		103	55-116			
1,2-Dibromoethane (EDB)	1390	25	ug/kg	1250		111	70-130			
Dibromomethane	1340	100	ug/kg	1250		107	70-130			
1,2-Dichlorobenzene	1310	100	ug/kg	1250		105	70-130			
1,3-Dichlorobenzene	1380	100	ug/kg	1250		110	70-130			
1,4-Dichlorobenzene	1310	100	ug/kg	1250		105	70-130			
Dichlorodifluoromethane	756	250	ug/kg	1250		60	15-117			
1,1-Dichloroethane	1120	100	ug/kg	1250		90	70-130			
1,2-Dichloroethane	1330	50	ug/kg	1250		107	71-139			
1,1-Dichloroethene	1030	250	ug/kg	1250		82	70-130			
cis-1,2-Dichloroethene	1170	100	ug/kg	1250		94	70-130			
trans-1,2-Dichloroethene	1110	100	ug/kg	1250		89	70-130			
1,2-Dichloropropane	1280	100	ug/kg	1250		102	70-130			
1,3-Dichloropropane	1260	100	ug/kg	1250		101	70-130			
2,2-Dichloropropane	946	100	ug/kg	1250		76	65-122			

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Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

LCS Analyzed: 06/28/2011 (11F1002-BS1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	1120	100	ug/kg	1250		90	70-130			
cis-1,3-Dichloropropene	1380	100	ug/kg	1250		111	70-130			
trans-1,3-Dichloropropene	1490	100	ug/kg	1250		119	70-130			
Ethylbenzene	1340	100	ug/kg	1250		108	70-130			
Hexachlorobutadiene	1540	250	ug/kg	1250		123	70-130			
2-Hexanone	1890	1000	ug/kg	1250		151	31-136			*L3*
Iodomethane	1240	250	ug/kg	1250		100	68-117			
Isopropylbenzene	1330	100	ug/kg	1250		107	70-130			
p-Isopropyltoluene	1440	100	ug/kg	1250		115	70-130			
Methylene Chloride	1150	500	ug/kg	1250		92	70-130			
4-Methyl-2-pentanone (MIBK)	1670	1000	ug/kg	1250		133	59-124			*L3*
Methyl-tert-butyl Ether (MTBE)	1340	250	ug/kg	1250		107	69-132			
Naphthalene	1380	250	ug/kg	1250		110	64-112			
n-Propylbenzene	1320	100	ug/kg	1250		106	70-130			
Styrene	1230	100	ug/kg	1250		98	70-130			
1,1,1,2-Tetrachloroethane	1350	250	ug/kg	1250		108	70-130			
1,1,2,2-Tetrachloroethane	1290	100	ug/kg	1250		104	63-129			
Tetrachloroethene	1290	100	ug/kg	1250		103	70-130			
Toluene	1360	100	ug/kg	1250		109	70-130			
1,2,3-Trichlorobenzene	1470	250	ug/kg	1250		118	70-130			
1,2,4-Trichlorobenzene	1460	250	ug/kg	1250		116	66-124			
1,1,1-Trichloroethane	1200	100	ug/kg	1250		96	70-130			
1,1,2-Trichloroethane	1510	100	ug/kg	1250		121	70-130			
Trichloroethene	1280	100	ug/kg	1250		102	70-130			
Trichlorofluoromethane	1270	250	ug/kg	1250		102	72-143			
1,2,3-Trichloropropane	1330	500	ug/kg	1250		106	64-125			
1,2,4-Trimethylbenzene	1390	100	ug/kg	1250		111	66-124			
1,3,5-Trimethylbenzene	1330	100	ug/kg	1250		106	70-130			
Vinyl Acetate	1110	1200	ug/kg	1250		89	46-150			
Vinyl chloride	724	250	ug/kg	1250		58	10-118			
Xylenes, Total	2680	150	ug/kg	2500		107	70-130			
Surrogate: Dibromofluoromethane	*1360*		*ug/kg*	*1250*		*108*	*70-130*			
Surrogate: Toluene-d8	*1360*		*ug/kg*	*1250*		*109*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1360*		*ug/kg*	*1250*		*109*	*70-130*			

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
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Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install
Report Number: PUF1569
Sampled: 06/27/11
Received: 06/27/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11F1002 Extracted: 06/28/11										
LCS Dup Analyzed: 06/28/2011 (11F1002-BSD1)										
Acetone	1490	1000	ug/kg	1240		120	20-150	19	50	
Benzene	1220	50	ug/kg	1240		98	70-130	6	33	
Bromobenzene	1330	250	ug/kg	1240		107	70-130	4	28	
Bromochloromethane	1400	250	ug/kg	1240		112	70-130	9	37	
Bromodichloromethane	1430	100	ug/kg	1240		115	70-130	6	34	
Bromoform	1330	250	ug/kg	1240		107	58-108	7	35	
Bromomethane	1230	250	ug/kg	1240		99	65-116	8	33	
2-Butanone (MEK)	1580	1000	ug/kg	1240		127	33-143	21	53	
n-Butylbenzene	1470	250	ug/kg	1240		119	70-130	4	27	
sec-Butylbenzene	1400	250	ug/kg	1240		113	70-130	3	28	
tert-Butylbenzene	1420	250	ug/kg	1240		114	70-130	8	27	
Carbon disulfide	1170	500	ug/kg	1240		94	53-119	6	35	
Carbon tetrachloride	1200	250	ug/kg	1240		96	68-133	3	32	
Chlorobenzene	1400	50	ug/kg	1240		112	70-130	4	29	
Chloroethane	1170	250	ug/kg	1240		94	67-120	6	32	
Chloroform	1350	100	ug/kg	1240		109	70-130	13	33	
Chloromethane	986	250	ug/kg	1240		79	44-121	3	36	
2-Chlorotoluene	1280	250	ug/kg	1240		103	70-130	7	27	
4-Chlorotoluene	1340	250	ug/kg	1240		108	70-130	9	28	
Dibromochloromethane	1320	100	ug/kg	1240		106	70-130	2	35	
1,2-Dibromo-3-chloropropane	1400	250	ug/kg	1240		113	55-116	9	42	
1,2-Dibromoethane (EDB)	1370	25	ug/kg	1240		110	70-130	2	36	
Dibromomethane	1300	100	ug/kg	1240		105	70-130	3	37	
1,2-Dichlorobenzene	1430	100	ug/kg	1240		115	70-130	8	28	
1,3-Dichlorobenzene	1470	100	ug/kg	1240		118	70-130	6	27	
1,4-Dichlorobenzene	1460	100	ug/kg	1240		117	70-130	10	27	
Dichlorodifluoromethane	785	250	ug/kg	1240		63	15-117	4	39	
1,1-Dichloroethane	1200	100	ug/kg	1240		96	70-130	7	33	
1,2-Dichloroethane	1530	50	ug/kg	1240		123	71-139	14	37	
1,1-Dichloroethene	1080	250	ug/kg	1240		87	70-130	5	31	
cis-1,2-Dichloroethene	1250	100	ug/kg	1240		101	70-130	7	35	
trans-1,2-Dichloroethene	1150	100	ug/kg	1240		92	70-130	3	31	
1,2-Dichloropropane	1360	100	ug/kg	1240		110	70-130	6	31	
1,3-Dichloropropane	1340	100	ug/kg	1240		108	70-130	6	32	
2,2-Dichloropropane	1070	100	ug/kg	1240		86	65-122	12	31	

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

LCS Dup Analyzed: 06/28/2011 (11F1002-BSD1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	1150	100	ug/kg	1240		93	70-130	2	30	
cis-1,3-Dichloropropene	1480	100	ug/kg	1240		119	70-130	7	35	
trans-1,3-Dichloropropene	1590	100	ug/kg	1240		128	70-130	7	37	
Ethylbenzene	1340	100	ug/kg	1240		108	70-130	0.4	28	
Hexachlorobutadiene	1700	250	ug/kg	1240		137	70-130	10	31	*L3*
2-Hexanone	1540	1000	ug/kg	1240		124	31-136	21	48	
Iodomethane	1330	250	ug/kg	1240		107	68-117	6	32	
Isopropylbenzene	1320	100	ug/kg	1240		106	70-130	0.8	27	
p-Isopropyltoluene	1590	100	ug/kg	1240		128	70-130	10	30	
Methylene Chloride	1200	500	ug/kg	1240		97	70-130	5	38	
4-Methyl-2-pentanone (MIBK)	1570	1000	ug/kg	1240		126	59-124	6	51	*L3*
Methyl-tert-butyl Ether (MTBE)	1420	250	ug/kg	1240		114	69-132	6	46	
Naphthalene	1450	250	ug/kg	1240		116	64-112	5	38	*L3*
n-Propylbenzene	1380	100	ug/kg	1240		111	70-130	5	29	
Styrene	1320	100	ug/kg	1240		106	70-130	7	30	
1,1,1,2-Tetrachloroethane	1390	250	ug/kg	1240		112	70-130	3	32	
1,1,2,2-Tetrachloroethane	1280	100	ug/kg	1240		103	63-129	1	38	
Tetrachloroethene	1370	100	ug/kg	1240		110	70-130	6	26	
Toluene	1390	100	ug/kg	1240		112	70-130	2	31	
1,2,3-Trichlorobenzene	1530	250	ug/kg	1240		123	70-130	4	35	
1,2,4-Trichlorobenzene	1610	250	ug/kg	1240		130	66-124	10	31	*L3*
1,1,1-Trichloroethane	1300	100	ug/kg	1240		104	70-130	8	32	
1,1,2-Trichloroethane	1460	100	ug/kg	1240		118	70-130	3	39	
Trichloroethene	1280	100	ug/kg	1240		103	70-130	0.1	29	
Trichlorofluoromethane	1320	250	ug/kg	1240		107	72-143	4	37	
1,2,3-Trichloropropane	1380	500	ug/kg	1240		111	64-125	3	39	
1,2,4-Trimethylbenzene	1430	100	ug/kg	1240		115	66-124	3	31	
1,3,5-Trimethylbenzene	1400	100	ug/kg	1240		112	70-130	5	27	
Vinyl Acetate	1170	1200	ug/kg	1240		94	46-150	5	50	
Vinyl chloride	812	250	ug/kg	1240		65	10-118	11	65	
Xylenes, Total	2780	150	ug/kg	2490		112	70-130	4	32	
Surrogate: Dibromofluoromethane	*1520*		*ug/kg*	*1240*		*122*	*70-130*			
Surrogate: Toluene-d8	*1400*		*ug/kg*	*1240*		*113*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1430*		*ug/kg*	*1240*		*115*	*70-130*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

Matrix Spike Analyzed: 06/28/2011 (11F1002-MS1) **Source: PUF1585-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Acetone	1300	1000	ug/kg	1250	ND	104	16-149			
Benzene	992	50	ug/kg	1250	ND	79	55-123			
Bromobenzene	1040	250	ug/kg	1250	ND	83	59-129			
Bromochloromethane	1120	250	ug/kg	1250	ND	90	56-129			
Bromodichloromethane	1110	100	ug/kg	1250	ND	88	60-124			
Bromoform	1020	250	ug/kg	1250	ND	82	51-109			
Bromomethane	885	250	ug/kg	1250	ND	71	39-123			
2-Butanone (MEK)	1240	1000	ug/kg	1250	ND	99	35-126			
n-Butylbenzene	1200	250	ug/kg	1250	ND	96	41-150			
sec-Butylbenzene	1170	250	ug/kg	1250	ND	94	40-146			
tert-Butylbenzene	1140	250	ug/kg	1250	ND	91	49-138			
Carbon disulfide	905	500	ug/kg	1250	ND	72	20-127			
Carbon tetrachloride	994	250	ug/kg	1250	ND	79	45-140			
Chlorobenzene	1120	50	ug/kg	1250	ND	90	61-123			
Chloroethane	898	250	ug/kg	1250	ND	72	44-125			
Chloroform	1070	100	ug/kg	1250	ND	85	57-131			
Chloromethane	763	250	ug/kg	1250	ND	61	28-119			
2-Chlorotoluene	1060	250	ug/kg	1250	ND	84	52-136			
4-Chlorotoluene	1100	250	ug/kg	1250	ND	88	56-136			
Dibromochloromethane	1110	100	ug/kg	1250	ND	88	59-117			
1,2-Dibromo-3-chloropropane	1120	250	ug/kg	1250	ND	90	44-121			
1,2-Dibromoethane (EDB)	1080	25	ug/kg	1250	ND	86	62-119			
Dibromomethane	1110	100	ug/kg	1250	ND	89	57-124			
1,2-Dichlorobenzene	1170	100	ug/kg	1250	ND	93	54-130			
1,3-Dichlorobenzene	1180	100	ug/kg	1250	ND	94	53-132			
1,4-Dichlorobenzene	1100	100	ug/kg	1250	ND	87	55-132			
Dichlorodifluoromethane	502	250	ug/kg	1250	ND	40	10-96			
1,1-Dichloroethane	974	100	ug/kg	1250	ND	78	57-132			
1,2-Dichloroethane	1180	50	ug/kg	1250	ND	94	52-138			
1,1-Dichloroethene	843	250	ug/kg	1250	ND	67	50-131			
cis-1,2-Dichloroethene	1070	100	ug/kg	1250	ND	86	58-118			
trans-1,2-Dichloroethene	912	100	ug/kg	1250	ND	73	57-128			
1,2-Dichloropropane	1060	100	ug/kg	1250	ND	85	61-124			
1,3-Dichloropropane	1070	100	ug/kg	1250	ND	85	63-116			
2,2-Dichloropropane	842	100	ug/kg	1250	ND	67	50-123			

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install
Report Number: PUF1569
Sampled: 06/27/11
Received: 06/27/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Matrix Spike Analyzed: 06/28/2011 (11F1002-MS1)					**Source: PUF1585-01**					
1,1-Dichloropropene	965	100	ug/kg	1250	ND	77	52-129			
cis-1,3-Dichloropropene	1190	100	ug/kg	1250	ND	95	50-139			
trans-1,3-Dichloropropene	1180	100	ug/kg	1250	ND	94	45-132			
Ethylbenzene	1120	100	ug/kg	1250	ND	89	54-133			
Hexachlorobutadiene	1350	250	ug/kg	1250	ND	108	10-150			
2-Hexanone	1170	1000	ug/kg	1250	ND	93	30-115			
Iodomethane	1050	250	ug/kg	1250	ND	83	42-125			
Isopropylbenzene	1060	100	ug/kg	1250	ND	85	60-144			
p-Isopropyltoluene	1230	100	ug/kg	1250	ND	98	44-140			
Methylene Chloride	932	500	ug/kg	1250	ND	74	52-132			
4-Methyl-2-pentanone (MIBK)	1260	1000	ug/kg	1250	ND	101	50-124			
Methyl-tert-butyl Ether (MTBE)	1090	250	ug/kg	1250	ND	87	56-128			
Naphthalene	1200	250	ug/kg	1250	ND	96	35-128			
n-Propylbenzene	1120	100	ug/kg	1250	ND	89	50-148			
Styrene	1060	100	ug/kg	1250	ND	85	45-122			
1,1,1,2-Tetrachloroethane	1100	250	ug/kg	1250	ND	88	63-120			
1,1,2,2-Tetrachloroethane	1040	100	ug/kg	1250	ND	83	44-139			
Tetrachloroethene	1080	100	ug/kg	1250	ND	87	47-138			
Toluene	1130	100	ug/kg	1250	ND	90	59-129			
1,2,3-Trichlorobenzene	1240	250	ug/kg	1250	ND	99	32-137			
1,2,4-Trichlorobenzene	1230	250	ug/kg	1250	ND	98	28-139			
1,1,1-Trichloroethane	1070	100	ug/kg	1250	ND	85	53-133			
1,1,2-Trichloroethane	1180	100	ug/kg	1250	ND	94	57-118			
Trichloroethene	1060	100	ug/kg	1250	ND	85	56-136			
Trichlorofluoromethane	1110	250	ug/kg	1250	ND	89	41-148			
1,2,3-Trichloropropane	1040	500	ug/kg	1250	ND	83	56-131			
1,2,4-Trimethylbenzene	1130	100	ug/kg	1250	ND	90	28-139			
1,3,5-Trimethylbenzene	1090	100	ug/kg	1250	ND	87	48-146			
Vinyl Acetate	744	1200	ug/kg	1250	ND	59	10-150			
Vinyl chloride	587	250	ug/kg	1250	ND	47	12-97			
Xylenes, Total	2290	150	ug/kg	2510	ND	91	57-122			
Surrogate: Dibromofluoromethane	*1190*		*ug/kg*	*1250*		*95*	*57-129*			
Surrogate: Toluene-d8	*1120*		*ug/kg*	*1250*		*90*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1150*		*ug/kg*	*1250*		*92*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

Matrix Spike Dup Analyzed: 06/28/2011 (11F1002-MSD1) **Source: PUF1585-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Acetone	1480	1000	ug/kg	1250	ND	118	16-149	13	40	
Benzene	997	50	ug/kg	1250	ND	80	55-123	0.5	20	
Bromobenzene	1040	250	ug/kg	1250	ND	83	59-129	0.2	23	
Bromochloromethane	1070	250	ug/kg	1250	ND	86	56-129	5	31	
Bromodichloromethane	1140	100	ug/kg	1250	ND	91	60-124	3	24	
Bromoform	1030	250	ug/kg	1250	ND	83	51-109	0.8	27	
Bromomethane	896	250	ug/kg	1250	ND	72	39-123	1	35	
2-Butanone (MEK)	1260	1000	ug/kg	1250	ND	101	35-126	2	39	
n-Butylbenzene	1240	250	ug/kg	1250	ND	100	41-150	3	28	
sec-Butylbenzene	1170	250	ug/kg	1250	ND	94	40-146	0.4	30	
tert-Butylbenzene	1150	250	ug/kg	1250	ND	92	49-138	0.6	29	
Carbon disulfide	884	500	ug/kg	1250	ND	71	20-127	2	32	
Carbon tetrachloride	947	250	ug/kg	1250	ND	76	45-140	5	23	
Chlorobenzene	1240	50	ug/kg	1250	ND	99	61-123	10	21	
Chloroethane	856	250	ug/kg	1250	ND	69	44-125	5	32	
Chloroform	1080	100	ug/kg	1250	ND	87	57-131	2	27	
Chloromethane	708	250	ug/kg	1250	ND	57	28-119	7	40	
2-Chlorotoluene	1050	250	ug/kg	1250	ND	84	52-136	0.5	23	
4-Chlorotoluene	1140	250	ug/kg	1250	ND	91	56-136	3	21	
Dibromochloromethane	1160	100	ug/kg	1250	ND	93	59-117	4	23	
1,2-Dibromo-3-chloropropane	1150	250	ug/kg	1250	ND	93	44-121	3	34	
1,2-Dibromoethane (EDB)	1180	25	ug/kg	1250	ND	95	62-119	9	24	
Dibromomethane	1150	100	ug/kg	1250	ND	93	57-124	4	26	
1,2-Dichlorobenzene	1170	100	ug/kg	1250	ND	93	54-130	0.06	23	
1,3-Dichlorobenzene	1160	100	ug/kg	1250	ND	93	53-132	1	23	
1,4-Dichlorobenzene	1140	100	ug/kg	1250	ND	91	55-132	4	22	
Dichlorodifluoromethane	475	250	ug/kg	1250	ND	38	10-96	6	25	
1,1-Dichloroethane	974	100	ug/kg	1250	ND	78	57-132	0.04	26	
1,2-Dichloroethane	1240	50	ug/kg	1250	ND	100	52-138	5	30	
1,1-Dichloroethene	781	250	ug/kg	1250	ND	63	50-131	8	32	
cis-1,2-Dichloroethene	1030	100	ug/kg	1250	ND	82	58-118	4	24	
trans-1,2-Dichloroethene	907	100	ug/kg	1250	ND	73	57-128	0.5	27	
1,2-Dichloropropane	1050	100	ug/kg	1250	ND	84	61-124	0.5	21	
1,3-Dichloropropane	1160	100	ug/kg	1250	ND	93	63-116	9	21	
2,2-Dichloropropane	789	100	ug/kg	1250	ND	63	50-123	6	26	

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1 Coop + Comm MW-113 Install
Report Number: PUF1569
Sampled: 06/27/11
Received: 06/27/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11F1002 Extracted: 06/28/11

Matrix Spike Dup Analyzed: 06/28/2011 (11F1002-MSD1) **Source: PUF1585-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	917	100	ug/kg	1250	ND	74	52-129	5	21	
cis-1,3-Dichloropropene	1180	100	ug/kg	1250	ND	95	50-139	0.6	25	
trans-1,3-Dichloropropene	1280	100	ug/kg	1250	ND	103	45-132	9	26	
Ethylbenzene	1170	100	ug/kg	1250	ND	94	54-133	4	27	
Hexachlorobutadiene	1300	250	ug/kg	1250	ND	104	10-150	4	34	
2-Hexanone	1390	1000	ug/kg	1250	ND	111	30-115	17	36	
Iodomethane	1000	250	ug/kg	1250	ND	80	42-125	4	30	
Isopropylbenzene	1060	100	ug/kg	1250	ND	85	60-144	0.2	29	
p-Isopropyltoluene	1270	100	ug/kg	1250	ND	102	44-140	4	30	
Methylene Chloride	991	500	ug/kg	1250	ND	79	52-132	6	30	
4-Methyl-2-pentanone (MIBK)	1350	1000	ug/kg	1250	ND	109	50-124	7	29	
Methyl-tert-butyl Ether (MTBE)	1110	250	ug/kg	1250	ND	89	56-128	2	32	
Naphthalene	1160	250	ug/kg	1250	ND	93	35-128	4	30	
n-Propylbenzene	1150	100	ug/kg	1250	ND	92	50-148	2	29	
Styrene	1180	100	ug/kg	1250	ND	95	45-122	11	22	
1,1,1,2-Tetrachloroethane	1210	250	ug/kg	1250	ND	97	63-120	9	21	
1,1,2,2-Tetrachloroethane	1000	100	ug/kg	1250	ND	80	44-139	4	40	
Tetrachloroethene	1140	100	ug/kg	1250	ND	92	47-138	5	31	
Toluene	1130	100	ug/kg	1250	ND	90	59-129	0.4	20	
1,2,3-Trichlorobenzene	1190	250	ug/kg	1250	ND	95	32-137	4	30	
1,2,4-Trichlorobenzene	1290	250	ug/kg	1250	ND	103	28-139	5	26	
1,1,1-Trichloroethane	1020	100	ug/kg	1250	ND	82	53-133	4	25	
1,1,2-Trichloroethane	1230	100	ug/kg	1250	ND	99	57-118	4	29	
Trichloroethene	1110	100	ug/kg	1250	ND	89	56-136	4	26	
Trichlorofluoromethane	1020	250	ug/kg	1250	ND	81	41-148	9	27	
1,2,3-Trichloropropane	1220	500	ug/kg	1250	ND	98	56-131	16	24	
1,2,4-Trimethylbenzene	1140	100	ug/kg	1250	ND	91	28-139	1	26	
1,3,5-Trimethylbenzene	1120	100	ug/kg	1250	ND	90	48-146	3	35	
Vinyl Acetate	546	1200	ug/kg	1250	ND	44	10-150	31	40	
Vinyl chloride	589	250	ug/kg	1250	ND	47	12-97	0.4	40	
Xylenes, Total	2390	150	ug/kg	2500	ND	96	57-122	4	22	
Surrogate: Dibromofluoromethane	*1120*		*ug/kg*	*1250*		*90*	*57-129*			
Surrogate: Toluene-d8	*1090*		*ug/kg*	*1250*		*87*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1240*		*ug/kg*	*1250*		*99*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

DATA QUALIFIERS AND DEFINITIONS

L3	The associated blank spike recovery was above method acceptance limits.
ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

Certification Summary

TestAmerica Phoenix

Method	Matrix	Nelac	Arizona
EPA 8260B	Soil	X	X

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

TestAmerica Phoenix

Linda Eshelman
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TAL-0013-550 (10/10)

CHAIN OF CUSTODY FORM

[ ] Phoenix - 4625 E. Cotton Center Blvd., Suite 189, Phoenix, AZ 85040 (602) 437-3340 FAX (602) 454-9303
[ ] Tucson - 1870 W. Prince Road, Suite 59, Tucson, AZ 85705 (520) 807-3801 FAX (520) 807-3803
[ ] Las Vegas - 6000 S Eastern Ave., Suite 5E, Las Vegas, NV 89119 (702) 429-1264

Page 1 of 1

Client Name/Address:
Hydro Geo chem, INC,
6370 E. Thomas Rd, ste. 200
Scottsdale, AZ 85251

Project/PO Number: 2010002.03, T8.1 coop + comm MW-113 Install

Project Manager: Chris Jacquemin

Phone Number: 480-421-1501 x145

Sampler: Neil J. Babb

Fax Number: 480-425-8794

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	8260B									Special Instructions
IDW Roll off #66181	Soil	8oz Jar	1	6-27-11	8:00	—	X									PVF1569-01

Relinquished By: Neil J. Babb	Date/Time: 6-27-11 / 9:15	Received By: Annefee Crume	Date/Time: 6-27-11 / 9:15	Turnaround Time: (Check) same day ____ 72 hours ____ 24 hours ____ 5 days ____ 48 hours ____ normal X
Relinquished By: Annefee Crume	Date/Time: 6-27-11 / 13:52	Received By:	Date/Time:	
Relinquished By:	Date/Time:	Received in Lab By:	Date/Time: 6/27/11 13:52	Sample Integrity: (Check) intact ✓ on ice ✓

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

3.6°

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

4625 East Cotton Center Blvd. Ste 189, Phoenix, AZ 85040 (602) 437-3340 Fax:(602) 454-9303

LABORATORY REPORT

Prepared For: Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project: 2010002.03, T8.1, Coop & Comm

Sampled: 07/07/11
Received: 07/07/11
Issued: 07/15/11 11:10

NELAP #01109CA Arizona DHS#AZ0728

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica. The Chain of Custody, 1 page, is included and is an integral part of this report.
This entire report was reviewed and approved for release.

CASE NARRATIVE

LABORATORY ID	CLIENT ID	MATRIX
PUG0416-01	IDWROLLOFF #66185	Soil

SAMPLE RECEIPT: Samples were received intact, at 2°C, on ice and with chain of custody documentation. Soil samples requiring volatile analysis were received in glass jars.

HOLDING TIMES: All samples were analyzed within prescribed holding times and/or in accordance with the TestAmerica Sample Acceptance Policy unless otherwise noted in the report.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
L3 - 8260 - Batch 11G0232-BS1 / PUG0416-01 - Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits for Hexachlorobutadiene. Analyte not detected, data not impacted.

COMMENTS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

Reviewed By:

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm
Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Sample ID: PUG0416-01 (IDWROLLOFF #66185 - Soil)

Reporting Units: ug/kg

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Acetone	EPA 8260B	11G0232	1000	ND	1.01	7/8/2011	7/12/2011	
Benzene	EPA 8260B	11G0232	50	ND	1.01	7/8/2011	7/12/2011	
Bromobenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Bromochloromethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Bromodichloromethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Bromoform	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Bromomethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
2-Butanone (MEK)	EPA 8260B	11G0232	1000	ND	1.01	7/8/2011	7/12/2011	
n-Butylbenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
sec-Butylbenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
tert-Butylbenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Carbon disulfide	EPA 8260B	11G0232	500	ND	1.01	7/8/2011	7/12/2011	
Carbon tetrachloride	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Chlorobenzene	EPA 8260B	11G0232	50	ND	1.01	7/8/2011	7/12/2011	
Chloroethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Chloroform	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Chloromethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
2-Chlorotoluene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
4-Chlorotoluene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Dibromochloromethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,2-Dibromo-3-chloropropane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,2-Dibromoethane (EDB)	EPA 8260B	11G0232	25	ND	1.01	7/8/2011	7/12/2011	
Dibromomethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,2-Dichlorobenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,3-Dichlorobenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,4-Dichlorobenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Dichlorodifluoromethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,1-Dichloroethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,2-Dichloroethane	EPA 8260B	11G0232	50	ND	1.01	7/8/2011	7/12/2011	
1,1-Dichloroethene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
cis-1,2-Dichloroethene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
trans-1,2-Dichloroethene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,2-Dichloropropane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,3-Dichloropropane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
2,2-Dichloropropane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,1-Dichloropropene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
cis-1,3-Dichloropropene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
trans-1,3-Dichloropropene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Ethylbenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Hexachlorobutadiene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	L3

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm

Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PUG0416-01 (IDWROLLOFF #66185 - Soil) - cont.								
Reporting Units: ug/kg								
2-Hexanone	EPA 8260B	11G0232	1000	ND	1.01	7/8/2011	7/12/2011	
Iodomethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Isopropylbenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
p-Isopropyltoluene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Methylene Chloride	EPA 8260B	11G0232	500	ND	1.01	7/8/2011	7/12/2011	
4-Methyl-2-pentanone (MIBK)	EPA 8260B	11G0232	1000	ND	1.01	7/8/2011	7/12/2011	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Naphthalene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
n-Propylbenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Styrene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,1,1,2-Tetrachloroethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,1,2,2-Tetrachloroethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Tetrachloroethene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Toluene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,2,3-Trichlorobenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,2,4-Trichlorobenzene	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,1,1-Trichloroethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,1,2-Trichloroethane	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Trichloroethene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Trichlorofluoromethane	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
1,2,3-Trichloropropane	EPA 8260B	11G0232	500	ND	1.01	7/8/2011	7/12/2011	
1,2,4-Trimethylbenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
1,3,5-Trimethylbenzene	EPA 8260B	11G0232	100	ND	1.01	7/8/2011	7/12/2011	
Vinyl Acetate	EPA 8260B	11G0232	1200	ND	1.01	7/8/2011	7/12/2011	
Vinyl chloride	EPA 8260B	11G0232	250	ND	1.01	7/8/2011	7/12/2011	
Xylenes, Total	EPA 8260B	11G0232	150	ND	1.01	7/8/2011	7/12/2011	
Surrogate: Dibromofluoromethane (57-129%)				*78 %*				
Surrogate: Toluene-d8 (59-134%)				*81 %*				
Surrogate: 4-Bromofluorobenzene (56-127%)				*79 %*				

Hydro Geo Chem, Inc. 6370 East Thomas Road, Suite 200 Scottsdale, AZ 85251-7056 Attention: Chris Jacquemin	Project ID: 2010002.03, T8.1, Coop & Comm Report Number: PUG0416	Sampled: 07/07/11 Received: 07/07/11

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: IDWROLLOFF #66185 (PUG0416-01) - Soil					
EPA 8260B	2	07/07/2011 14:15	07/07/2011 17:15	07/08/2011 19:50	07/12/2011 11:15

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
Blank Analyzed: 07/11/2011 (11G0232-BLK1)										
Acetone	ND	1000	ug/kg							
Benzene	ND	50	ug/kg							
Bromobenzene	ND	250	ug/kg							
Bromochloromethane	ND	250	ug/kg							
Bromodichloromethane	ND	100	ug/kg							
Bromoform	ND	250	ug/kg							
Bromomethane	ND	250	ug/kg							
2-Butanone (MEK)	ND	1000	ug/kg							
n-Butylbenzene	ND	250	ug/kg							
sec-Butylbenzene	ND	250	ug/kg							
tert-Butylbenzene	ND	250	ug/kg							
Carbon disulfide	ND	500	ug/kg							
Carbon tetrachloride	ND	250	ug/kg							
Chlorobenzene	ND	50	ug/kg							
Chloroethane	ND	250	ug/kg							
Chloroform	ND	100	ug/kg							
Chloromethane	ND	250	ug/kg							
2-Chlorotoluene	ND	250	ug/kg							
4-Chlorotoluene	ND	250	ug/kg							
Dibromochloromethane	ND	100	ug/kg							
1,2-Dibromo-3-chloropropane	ND	250	ug/kg							
1,2-Dibromoethane (EDB)	ND	25	ug/kg							
Dibromomethane	ND	100	ug/kg							
1,2-Dichlorobenzene	ND	100	ug/kg							
1,3-Dichlorobenzene	ND	100	ug/kg							
1,4-Dichlorobenzene	ND	100	ug/kg							
Dichlorodifluoromethane	ND	250	ug/kg							
1,1-Dichloroethane	ND	100	ug/kg							
1,2-Dichloroethane	ND	50	ug/kg							
1,1-Dichloroethene	ND	250	ug/kg							
cis-1,2-Dichloroethene	ND	100	ug/kg							
trans-1,2-Dichloroethene	ND	100	ug/kg							
1,2-Dichloropropane	ND	100	ug/kg							
1,3-Dichloropropane	ND	100	ug/kg							
2,2-Dichloropropane	ND	100	ug/kg							

Hydro Geo Chem, Inc.
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Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm
Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
Blank Analyzed: 07/11/2011 (11G0232-BLK1)										
1,1-Dichloropropene	ND	100	ug/kg							
cis-1,3-Dichloropropene	ND	100	ug/kg							
trans-1,3-Dichloropropene	ND	100	ug/kg							
Ethylbenzene	ND	100	ug/kg							
Hexachlorobutadiene	ND	250	ug/kg							
2-Hexanone	ND	1000	ug/kg							
Iodomethane	ND	250	ug/kg							
Isopropylbenzene	ND	100	ug/kg							
p-Isopropyltoluene	ND	100	ug/kg							
Methylene Chloride	ND	500	ug/kg							
4-Methyl-2-pentanone (MIBK)	ND	1000	ug/kg							
Methyl-tert-butyl Ether (MTBE)	ND	250	ug/kg							
Naphthalene	ND	250	ug/kg							
n-Propylbenzene	ND	100	ug/kg							
Styrene	ND	100	ug/kg							
1,1,1,2-Tetrachloroethane	ND	250	ug/kg							
1,1,2,2-Tetrachloroethane	ND	100	ug/kg							
Tetrachloroethene	ND	100	ug/kg							
Toluene	ND	100	ug/kg							
1,2,3-Trichlorobenzene	ND	250	ug/kg							
1,2,4-Trichlorobenzene	ND	250	ug/kg							
1,1,1-Trichloroethane	ND	100	ug/kg							
1,1,2-Trichloroethane	ND	100	ug/kg							
Trichloroethene	ND	100	ug/kg							
Trichlorofluoromethane	ND	250	ug/kg							
1,2,3-Trichloropropane	ND	500	ug/kg							
1,2,4-Trimethylbenzene	ND	100	ug/kg							
1,3,5-Trimethylbenzene	ND	100	ug/kg							
Vinyl Acetate	ND	1200	ug/kg							
Vinyl chloride	ND	250	ug/kg							
Xylenes, Total	ND	150	ug/kg							
Surrogate: Dibromofluoromethane	*1230*		*ug/kg*	*1250*		*98*	*57-129*			
Surrogate: Toluene-d8	*1270*		*ug/kg*	*1250*		*102*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1180*		*ug/kg*	*1250*		*94*	*56-127*			

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Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
LCS Analyzed: 07/11/2011 (11G0232-BS1)										
Acetone	1220	1000	ug/kg	1250		98	20-150			
Benzene	1320	50	ug/kg	1250		105	70-130			
Bromobenzene	1260	250	ug/kg	1250		101	70-130			
Bromochloromethane	1370	250	ug/kg	1250		110	70-130			
Bromodichloromethane	1300	100	ug/kg	1250		104	70-130			
Bromoform	1070	250	ug/kg	1250		86	58-108			
Bromomethane	1200	250	ug/kg	1250		96	65-116			
2-Butanone (MEK)	1380	1000	ug/kg	1250		111	33-143			
n-Butylbenzene	1300	250	ug/kg	1250		104	70-130			
sec-Butylbenzene	1360	250	ug/kg	1250		109	70-130			
tert-Butylbenzene	1290	250	ug/kg	1250		103	70-130			
Carbon disulfide	1290	500	ug/kg	1250		103	53-119			
Carbon tetrachloride	1320	250	ug/kg	1250		106	68-133			
Chlorobenzene	1390	50	ug/kg	1250		111	70-130			
Chloroethane	1200	250	ug/kg	1250		96	67-120			
Chloroform	1310	100	ug/kg	1250		105	70-130			
Chloromethane	1030	250	ug/kg	1250		82	44-121			
2-Chlorotoluene	1150	250	ug/kg	1250		92	70-130			
4-Chlorotoluene	1230	250	ug/kg	1250		99	70-130			
Dibromochloromethane	1380	100	ug/kg	1250		110	70-130			
1,2-Dibromo-3-chloropropane	1150	250	ug/kg	1250		92	55-116			
1,2-Dibromoethane (EDB)	1370	25	ug/kg	1250		110	70-130			
Dibromomethane	1310	100	ug/kg	1250		105	70-130			
1,2-Dichlorobenzene	1310	100	ug/kg	1250		105	70-130			
1,3-Dichlorobenzene	1350	100	ug/kg	1250		108	70-130			
1,4-Dichlorobenzene	1300	100	ug/kg	1250		104	70-130			
Dichlorodifluoromethane	835	250	ug/kg	1250		67	15-117			
1,1-Dichloroethane	1300	100	ug/kg	1250		104	70-130			
1,2-Dichloroethane	1270	50	ug/kg	1250		102	71-139			
1,1-Dichloroethene	1180	250	ug/kg	1250		94	70-130			
cis-1,2-Dichloroethene	1230	100	ug/kg	1250		99	70-130			
trans-1,2-Dichloroethene	1290	100	ug/kg	1250		103	70-130			
1,2-Dichloropropane	1320	100	ug/kg	1250		106	70-130			
1,3-Dichloropropane	1350	100	ug/kg	1250		108	70-130			
2,2-Dichloropropane	1200	100	ug/kg	1250		96	65-122			

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
LCS Analyzed: 07/11/2011 (11G0232-BS1)										
1,1-Dichloropropene	1290	100	ug/kg	1250		104	70-130			
cis-1,3-Dichloropropene	1390	100	ug/kg	1250		111	70-130			
trans-1,3-Dichloropropene	1360	100	ug/kg	1250		109	70-130			
Ethylbenzene	1440	100	ug/kg	1250		115	70-130			
Hexachlorobutadiene	1650	250	ug/kg	1250		133	70-130			*L3*
2-Hexanone	1360	1000	ug/kg	1250		109	31-136			
Iodomethane	1320	250	ug/kg	1250		106	68-117			
Isopropylbenzene	1240	100	ug/kg	1250		100	70-130			
p-Isopropyltoluene	1380	100	ug/kg	1250		111	70-130			
Methylene Chloride	1170	500	ug/kg	1250		94	70-130			
4-Methyl-2-pentanone (MIBK)	1450	1000	ug/kg	1250		116	59-124			
Methyl-tert-butyl Ether (MTBE)	1250	250	ug/kg	1250		100	69-132			
Naphthalene	1080	250	ug/kg	1250		87	64-112			
n-Propylbenzene	1310	100	ug/kg	1250		105	70-130			
Styrene	1340	100	ug/kg	1250		107	70-130			
1,1,1,2-Tetrachloroethane	1380	250	ug/kg	1250		110	70-130			
1,1,2,2-Tetrachloroethane	1160	100	ug/kg	1250		93	63-129			
Tetrachloroethene	1520	100	ug/kg	1250		122	70-130			
Toluene	1430	100	ug/kg	1250		114	70-130			
1,2,3-Trichlorobenzene	1270	250	ug/kg	1250		102	70-130			
1,2,4-Trichlorobenzene	1300	250	ug/kg	1250		104	66-124			
1,1,1-Trichloroethane	1300	100	ug/kg	1250		104	70-130			
1,1,2-Trichloroethane	1430	100	ug/kg	1250		115	70-130			
Trichloroethene	1360	100	ug/kg	1250		109	70-130			
Trichlorofluoromethane	1430	250	ug/kg	1250		115	72-143			
1,2,3-Trichloropropane	1210	500	ug/kg	1250		97	64-125			
1,2,4-Trimethylbenzene	1310	100	ug/kg	1250		105	66-124			
1,3,5-Trimethylbenzene	1270	100	ug/kg	1250		102	70-130			
Vinyl Acetate	1100	1200	ug/kg	1250		88	46-150			
Vinyl chloride	233	250	ug/kg	1250		19	10-118			
Xylenes, Total	2770	150	ug/kg	2500		111	70-130			
Surrogate: Dibromofluoromethane	*1290*		*ug/kg*	*1250*		*103*	*70-130*			
Surrogate: Toluene-d8	*1360*		*ug/kg*	*1250*		*109*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1440*		*ug/kg*	*1250*		*115*	*70-130*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
LCS Dup Analyzed: 07/11/2011 (11G0232-BSD1)										
Acetone	768	1000	ug/kg	1250		62	20-150	46	50	
Benzene	1220	50	ug/kg	1250		98	70-130	8	33	
Bromobenzene	1190	250	ug/kg	1250		95	70-130	6	28	
Bromochloromethane	1200	250	ug/kg	1250		96	70-130	13	37	
Bromodichloromethane	1230	100	ug/kg	1250		98	70-130	6	34	
Bromoform	984	250	ug/kg	1250		79	58-108	8	35	
Bromomethane	1090	250	ug/kg	1250		87	65-116	10	33	
2-Butanone (MEK)	925	1000	ug/kg	1250		74	33-143	40	53	
n-Butylbenzene	1240	250	ug/kg	1250		99	70-130	5	27	
sec-Butylbenzene	1280	250	ug/kg	1250		103	70-130	6	28	
tert-Butylbenzene	1220	250	ug/kg	1250		98	70-130	5	27	
Carbon disulfide	1160	500	ug/kg	1250		93	53-119	11	35	
Carbon tetrachloride	1260	250	ug/kg	1250		101	68-133	4	32	
Chlorobenzene	1220	50	ug/kg	1250		98	70-130	13	29	
Chloroethane	1120	250	ug/kg	1250		90	67-120	7	32	
Chloroform	1150	100	ug/kg	1250		93	70-130	13	33	
Chloromethane	906	250	ug/kg	1250		73	44-121	12	36	
2-Chlorotoluene	1120	250	ug/kg	1250		90	70-130	3	27	
4-Chlorotoluene	1130	250	ug/kg	1250		91	70-130	8	28	
Dibromochloromethane	1190	100	ug/kg	1250		96	70-130	14	35	
1,2-Dibromo-3-chloropropane	1030	250	ug/kg	1250		83	55-116	11	42	
1,2-Dibromoethane (EDB)	1240	25	ug/kg	1250		99	70-130	10	36	
Dibromomethane	1210	100	ug/kg	1250		97	70-130	8	37	
1,2-Dichlorobenzene	1250	100	ug/kg	1250		100	70-130	5	28	
1,3-Dichlorobenzene	1270	100	ug/kg	1250		101	70-130	7	27	
1,4-Dichlorobenzene	1210	100	ug/kg	1250		97	70-130	7	27	
Dichlorodifluoromethane	748	250	ug/kg	1250		60	15-117	11	39	
1,1-Dichloroethane	1170	100	ug/kg	1250		93	70-130	11	33	
1,2-Dichloroethane	1130	50	ug/kg	1250		91	71-139	11	37	
1,1-Dichloroethene	1090	250	ug/kg	1250		87	70-130	8	31	
cis-1,2-Dichloroethene	1150	100	ug/kg	1250		92	70-130	7	35	
trans-1,2-Dichloroethene	1170	100	ug/kg	1250		94	70-130	9	31	
1,2-Dichloropropane	1220	100	ug/kg	1250		98	70-130	8	31	
1,3-Dichloropropane	1200	100	ug/kg	1250		96	70-130	11	32	
2,2-Dichloropropane	1070	100	ug/kg	1250		86	65-122	11	31	

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm
Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
LCS Dup Analyzed: 07/11/2011 (11G0232-BSD1)										
1,1-Dichloropropene	1200	100	ug/kg	1250		97	70-130	7	30	
cis-1,3-Dichloropropene	1280	100	ug/kg	1250		103	70-130	8	35	
trans-1,3-Dichloropropene	1250	100	ug/kg	1250		100	70-130	8	37	
Ethylbenzene	1310	100	ug/kg	1250		105	70-130	10	28	
Hexachlorobutadiene	1530	250	ug/kg	1250		123	70-130	8	31	
2-Hexanone	964	1000	ug/kg	1250		77	31-136	34	48	
Iodomethane	1200	250	ug/kg	1250		96	68-117	10	32	
Isopropylbenzene	1250	100	ug/kg	1250		100	70-130	0.5	27	
p-Isopropyltoluene	1350	100	ug/kg	1250		108	70-130	3	30	
Methylene Chloride	1060	500	ug/kg	1250		85	70-130	9	38	
4-Methyl-2-pentanone (MIBK)	1270	1000	ug/kg	1250		102	59-124	13	51	
Methyl-tert-butyl Ether (MTBE)	1070	250	ug/kg	1250		86	69-132	15	46	
Naphthalene	965	250	ug/kg	1250		77	64-112	12	38	
n-Propylbenzene	1270	100	ug/kg	1250		102	70-130	3	29	
Styrene	1170	100	ug/kg	1250		94	70-130	13	30	
1,1,1,2-Tetrachloroethane	1240	250	ug/kg	1250		99	70-130	10	32	
1,1,2,2-Tetrachloroethane	1060	100	ug/kg	1250		85	63-129	8	38	
Tetrachloroethene	1400	100	ug/kg	1250		112	70-130	8	26	
Toluene	1280	100	ug/kg	1250		103	70-130	11	31	
1,2,3-Trichlorobenzene	1140	250	ug/kg	1250		91	70-130	11	35	
1,2,4-Trichlorobenzene	1230	250	ug/kg	1250		98	66-124	5	31	
1,1,1-Trichloroethane	1200	100	ug/kg	1250		96	70-130	8	32	
1,1,2-Trichloroethane	1250	100	ug/kg	1250		100	70-130	14	39	
Trichloroethene	1310	100	ug/kg	1250		105	70-130	4	29	
Trichlorofluoromethane	1260	250	ug/kg	1250		101	72-143	13	37	
1,2,3-Trichloropropane	1150	500	ug/kg	1250		92	64-125	5	39	
1,2,4-Trimethylbenzene	1260	100	ug/kg	1250		101	66-124	4	31	
1,3,5-Trimethylbenzene	1230	100	ug/kg	1250		99	70-130	4	27	
Vinyl Acetate	951	1200	ug/kg	1250		76	46-150	15	50	
Vinyl chloride	236	250	ug/kg	1250		19	10-118	1	65	
Xylenes, Total	2500	150	ug/kg	2500		100	70-130	11	32	
Surrogate: Dibromofluoromethane	*1150*		*ug/kg*	*1250*		*92*	*70-130*			
Surrogate: Toluene-d8	*1270*		*ug/kg*	*1250*		*101*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*1230*		*ug/kg*	*1250*		*99*	*70-130*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11G0232 Extracted: 07/08/11

Matrix Spike Analyzed: 07/11/2011 (11G0232-MS1) **Source: PUG0469-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Acetone	739	1000	ug/kg	1250	ND	59	16-149			
Benzene	1160	50	ug/kg	1250	ND	93	55-123			
Bromobenzene	1160	250	ug/kg	1250	ND	93	59-129			
Bromochloromethane	1200	250	ug/kg	1250	ND	96	56-129			
Bromodichloromethane	1100	100	ug/kg	1250	ND	88	60-124			
Bromoform	926	250	ug/kg	1250	ND	74	51-109			
Bromomethane	1120	250	ug/kg	1250	ND	90	39-123			
2-Butanone (MEK)	885	1000	ug/kg	1250	ND	71	35-126			
n-Butylbenzene	1090	250	ug/kg	1250	ND	88	41-150			
sec-Butylbenzene	1250	250	ug/kg	1250	ND	100	40-146			
tert-Butylbenzene	1150	250	ug/kg	1250	ND	92	49-138			
Carbon disulfide	1170	500	ug/kg	1250	ND	94	20-127			
Carbon tetrachloride	1170	250	ug/kg	1250	ND	94	45-140			
Chlorobenzene	1130	50	ug/kg	1250	ND	91	61-123			
Chloroethane	1180	250	ug/kg	1250	ND	95	44-125			
Chloroform	1160	100	ug/kg	1250	ND	93	57-131			
Chloromethane	910	250	ug/kg	1250	ND	73	28-119			
2-Chlorotoluene	1150	250	ug/kg	1250	ND	92	52-136			
4-Chlorotoluene	1190	250	ug/kg	1250	ND	96	56-136			
Dibromochloromethane	1080	100	ug/kg	1250	ND	87	59-117			
1,2-Dibromo-3-chloropropane	1100	250	ug/kg	1250	ND	88	44-121			
1,2-Dibromoethane (EDB)	1140	25	ug/kg	1250	ND	91	62-119			
Dibromomethane	1110	100	ug/kg	1250	ND	89	57-124			
1,2-Dichlorobenzene	1170	100	ug/kg	1250	ND	94	54-130			
1,3-Dichlorobenzene	1200	100	ug/kg	1250	ND	97	53-132			
1,4-Dichlorobenzene	1180	100	ug/kg	1250	ND	95	55-132			
Dichlorodifluoromethane	694	250	ug/kg	1250	ND	56	10-96			
1,1-Dichloroethane	1170	100	ug/kg	1250	ND	94	57-132			
1,2-Dichloroethane	1120	50	ug/kg	1250	ND	90	52-138			
1,1-Dichloroethene	1110	250	ug/kg	1250	ND	89	50-131			
cis-1,2-Dichloroethene	1110	100	ug/kg	1250	ND	89	58-118			
trans-1,2-Dichloroethene	1120	100	ug/kg	1250	ND	90	57-128			
1,2-Dichloropropane	1120	100	ug/kg	1250	ND	90	61-124			
1,3-Dichloropropane	1110	100	ug/kg	1250	ND	89	63-116			
2,2-Dichloropropane	1110	100	ug/kg	1250	ND	89	50-123			

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm

Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11G0232 Extracted: 07/08/11

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Matrix Spike Analyzed: 07/11/2011 (11G0232-MS1)					**Source: PUG0469-01**					
1,1-Dichloropropene	1150	100	ug/kg	1250	ND	92	52-129			
cis-1,3-Dichloropropene	1110	100	ug/kg	1250	ND	89	50-139			
trans-1,3-Dichloropropene	1110	100	ug/kg	1250	ND	89	45-132			
Ethylbenzene	1180	100	ug/kg	1250	ND	95	54-133			
Hexachlorobutadiene	952	250	ug/kg	1250	ND	76	10-150			
2-Hexanone	892	1000	ug/kg	1250	ND	72	30-115			
Iodomethane	1220	250	ug/kg	1250	ND	98	42-125			
Isopropylbenzene	1260	100	ug/kg	1250	ND	101	60-144			
p-Isopropyltoluene	1190	100	ug/kg	1250	ND	96	44-140			
Methylene Chloride	1080	500	ug/kg	1250	ND	87	52-132			
4-Methyl-2-pentanone (MIBK)	1230	1000	ug/kg	1250	ND	99	50-124			
Methyl-tert-butyl Ether (MTBE)	1020	250	ug/kg	1250	ND	82	56-128			
Naphthalene	816	250	ug/kg	1250	ND	66	35-128			
n-Propylbenzene	1260	100	ug/kg	1250	ND	101	50-148			
Styrene	1060	100	ug/kg	1250	ND	85	45-122			
1,1,1,2-Tetrachloroethane	1110	250	ug/kg	1250	ND	89	63-120			
1,1,2,2-Tetrachloroethane	1120	100	ug/kg	1250	ND	90	44-139			
Tetrachloroethene	1240	100	ug/kg	1250	ND	100	47-138			
Toluene	1190	100	ug/kg	1250	ND	96	59-129			
1,2,3-Trichlorobenzene	830	250	ug/kg	1250	ND	67	32-137			
1,2,4-Trichlorobenzene	954	250	ug/kg	1250	ND	77	28-139			
1,1,1-Trichloroethane	1190	100	ug/kg	1250	ND	95	53-133			
1,1,2-Trichloroethane	1140	100	ug/kg	1250	ND	92	57-118			
Trichloroethene	1210	100	ug/kg	1250	ND	97	56-136			
Trichlorofluoromethane	1340	250	ug/kg	1250	ND	107	41-148			
1,2,3-Trichloropropane	1200	500	ug/kg	1250	ND	96	56-131			
1,2,4-Trimethylbenzene	1180	100	ug/kg	1250	ND	95	28-139			
1,3,5-Trimethylbenzene	1230	100	ug/kg	1250	ND	98	48-146			
Vinyl Acetate	445	1200	ug/kg	1250	ND	36	10-150			
Vinyl chloride	259	250	ug/kg	1250	ND	21	12-97			
Xylenes, Total	2230	150	ug/kg	2490	ND	90	57-122			
Surrogate: Dibromofluoromethane	*1130*		*ug/kg*	*1250*		*90*	*57-129*			
Surrogate: Toluene-d8	*1140*		*ug/kg*	*1250*		*91*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1100*		*ug/kg*	*1250*		*88*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 11G0232 Extracted: 07/08/11										
Matrix Spike Dup Analyzed: 07/11/2011 (11G0232-MSD1)					**Source: PUG0469-01**					
Acetone	942	1000	ug/kg	1250	ND	75	16-149	24	40	
Benzene	1210	50	ug/kg	1250	ND	97	55-123	5	20	
Bromobenzene	1180	250	ug/kg	1250	ND	94	59-129	1	23	
Bromochloromethane	1280	250	ug/kg	1250	ND	102	56-129	7	31	
Bromodichloromethane	1150	100	ug/kg	1250	ND	91	60-124	4	24	
Bromoform	935	250	ug/kg	1250	ND	75	51-109	1	27	
Bromomethane	1100	250	ug/kg	1250	ND	88	39-123	2	35	
2-Butanone (MEK)	1010	1000	ug/kg	1250	ND	81	35-126	13	39	
n-Butylbenzene	1100	250	ug/kg	1250	ND	88	41-150	0.7	28	
sec-Butylbenzene	1190	250	ug/kg	1250	ND	95	40-146	4	30	
tert-Butylbenzene	1190	250	ug/kg	1250	ND	95	49-138	4	29	
Carbon disulfide	1180	500	ug/kg	1250	ND	94	20-127	1	32	
Carbon tetrachloride	1190	250	ug/kg	1250	ND	95	45-140	2	23	
Chlorobenzene	1220	50	ug/kg	1250	ND	97	61-123	7	21	
Chloroethane	1190	250	ug/kg	1250	ND	95	44-125	0.6	32	
Chloroform	1230	100	ug/kg	1250	ND	98	57-131	6	27	
Chloromethane	902	250	ug/kg	1250	ND	72	28-119	0.9	40	
2-Chlorotoluene	1140	250	ug/kg	1250	ND	91	52-136	1	23	
4-Chlorotoluene	1190	250	ug/kg	1250	ND	95	56-136	0.1	21	
Dibromochloromethane	1110	100	ug/kg	1250	ND	89	59-117	3	23	
1,2-Dibromo-3-chloropropane	1060	250	ug/kg	1250	ND	85	44-121	3	34	
1,2-Dibromoethane (EDB)	1200	25	ug/kg	1250	ND	96	62-119	6	24	
Dibromomethane	1210	100	ug/kg	1250	ND	97	57-124	9	26	
1,2-Dichlorobenzene	1170	100	ug/kg	1250	ND	94	54-130	0.1	23	
1,3-Dichlorobenzene	1200	100	ug/kg	1250	ND	96	53-132	0.5	23	
1,4-Dichlorobenzene	1190	100	ug/kg	1250	ND	95	55-132	1	22	
Dichlorodifluoromethane	602	250	ug/kg	1250	ND	48	10-96	14	25	
1,1-Dichloroethane	1200	100	ug/kg	1250	ND	96	57-132	2	26	
1,2-Dichloroethane	1220	50	ug/kg	1250	ND	97	52-138	8	30	
1,1-Dichloroethene	1140	250	ug/kg	1250	ND	91	50-131	2	32	
cis-1,2-Dichloroethene	1180	100	ug/kg	1250	ND	94	58-118	6	24	
trans-1,2-Dichloroethene	1190	100	ug/kg	1250	ND	95	57-128	6	27	
1,2-Dichloropropane	1170	100	ug/kg	1250	ND	93	61-124	5	21	
1,3-Dichloropropane	1190	100	ug/kg	1250	ND	95	63-116	7	21	
2,2-Dichloropropane	1150	100	ug/kg	1250	ND	92	50-123	4	26	

METHOD BLANK/QC DATA

VOLATILE ORGANICS BY GC/MS (EPA 5035/8260B)

Batch: 11G0232 Extracted: 07/08/11

Matrix Spike Dup Analyzed: 07/11/2011 (11G0232-MSD1) **Source: PUG0469-01**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
1,1-Dichloropropene	1210	100	ug/kg	1250	ND	97	52-129	5	21	
cis-1,3-Dichloropropene	1200	100	ug/kg	1250	ND	96	50-139	8	25	
trans-1,3-Dichloropropene	1140	100	ug/kg	1250	ND	91	45-132	3	26	
Ethylbenzene	1260	100	ug/kg	1250	ND	101	54-133	7	27	
Hexachlorobutadiene	942	250	ug/kg	1250	ND	75	10-150	1	34	
2-Hexanone	968	1000	ug/kg	1250	ND	77	30-115	8	36	
Iodomethane	1220	250	ug/kg	1250	ND	98	42-125	0.5	30	
Isopropylbenzene	1250	100	ug/kg	1250	ND	100	60-144	1	29	
p-Isopropyltoluene	1250	100	ug/kg	1250	ND	100	44-140	5	30	
Methylene Chloride	1160	500	ug/kg	1250	ND	92	52-132	7	30	
4-Methyl-2-pentanone (MIBK)	1240	1000	ug/kg	1250	ND	99	50-124	0.6	29	
Methyl-tert-butyl Ether (MTBE)	1050	250	ug/kg	1250	ND	84	56-128	3	32	
Naphthalene	815	250	ug/kg	1250	ND	65	35-128	0.07	30	
n-Propylbenzene	1280	100	ug/kg	1250	ND	102	50-148	1	29	
Styrene	1130	100	ug/kg	1250	ND	90	45-122	7	22	
1,1,1,2-Tetrachloroethane	1170	250	ug/kg	1250	ND	93	63-120	5	21	
1,1,2,2-Tetrachloroethane	1140	100	ug/kg	1250	ND	91	44-139	2	40	
Tetrachloroethene	1300	100	ug/kg	1250	ND	104	47-138	5	31	
Toluene	1250	100	ug/kg	1250	ND	100	59-129	5	20	
1,2,3-Trichlorobenzene	816	250	ug/kg	1250	ND	65	32-137	2	30	
1,2,4-Trichlorobenzene	909	250	ug/kg	1250	ND	73	28-139	5	26	
1,1,1-Trichloroethane	1220	100	ug/kg	1250	ND	97	53-133	3	25	
1,1,2-Trichloroethane	1190	100	ug/kg	1250	ND	95	57-118	4	29	
Trichloroethene	1240	100	ug/kg	1250	ND	99	56-136	3	26	
Trichlorofluoromethane	1350	250	ug/kg	1250	ND	108	41-148	1	27	
1,2,3-Trichloropropane	1260	500	ug/kg	1250	ND	101	56-131	5	24	
1,2,4-Trimethylbenzene	1190	100	ug/kg	1250	ND	95	28-139	1	26	
1,3,5-Trimethylbenzene	1240	100	ug/kg	1250	ND	99	48-146	0.9	35	
Vinyl Acetate	443	1200	ug/kg	1250	ND	35	10-150	0.3	40	
Vinyl chloride	259	250	ug/kg	1250	ND	21	12-97	0.4	40	
Xylenes, Total	2440	150	ug/kg	2510	ND	98	57-122	9	22	
Surrogate: Dibromofluoromethane	*1150*		*ug/kg*	*1250*		*92*	*57-129*			
Surrogate: Toluene-d8	*1200*		*ug/kg*	*1250*		*96*	*59-134*			
Surrogate: 4-Bromofluorobenzene	*1100*		*ug/kg*	*1250*		*88*	*56-127*			

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc.
6370 East Thomas Road, Suite 200
Scottsdale, AZ 85251-7056
Attention: Chris Jacquemin

Project ID: 2010002.03, T8.1, Coop & Comm

Report Number: PUG0416

Sampled: 07/07/11
Received: 07/07/11

DATA QUALIFIERS AND DEFINITIONS

L3	The associated blank spike recovery was above method acceptance limits.
ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

TestAmerica Phoenix

Linda Eshelman
Project Manager

Hydro Geo Chem, Inc. 6370 East Thomas Road, Suite 200 Scottsdale, AZ 85251-7056 Attention: Chris Jacquemin	Project ID: 2010002.03, T8.1, Coop & Comm Report Number: PUG0416	Sampled: 07/07/11 Received: 07/07/11	

Certification Summary

TestAmerica Phoenix

Method	Matrix	Nelac	Arizona
EPA 8260B	Soil	X	X

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

TestAmerica Phoenix

Linda Eshelman
Project Manager

mw-114 locale

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-0013-550 (10/10)

CHAIN OF CUSTODY FORM

PUG0416

[ ] **Phoenix** - 4625 E. Cotton Center Blvd., Suite 189, Phoenix, AZ 85040 (602) 437-3340 FAX (602) 454-9303
[ ] **Tucson** - 1870 W. Prince Road, Suite 59, Tucson, AZ 85705 (520) 807-3801 FAX (520) 807-3803
[ ] **Las Vegas** - 6000 S Eastern Ave., Suite 5E, Las Vegas, NV 89119 (702) 429-1264

Page 1 of 1

Client Name / Address:
Hydro Geo chem, Inc.
6370 E. Thomas Rd., Ste. 200
Scottsdale, AZ 85251

Project / PO Number:
20100203, T81
coop & comm; mw-114
Install

Project Manager: Chris Jacquemin

Sampler: ~~#~~ Sean Jacquemin

Phone Number: 480-421-1501 x145

Fax Number: 480-425-8794

Analysis Required

Sampla Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	8260B									Special Instructions
IDW Rolloff #66185	Soil	8oz glass	1	7-7-11	14:18	—	X									01

Relinquished By:	Date / Time: 7-7-11 / 14:30	Received By:	Date / Time: 7-7-11 / 14:30
Relinquished By:	Date / Time: 7-7-11 / 17:15	Received By:	Date / Time:
Relinquished By:	Date / Time:	Received in Lab By:	Date / Time: 7/7/11 1715

Turnaround Time: (Check)
same day ______ 72 hours ______
24 hours ______ 5 days ______
48 hours ______ normal X

Sample Integrity: (Check)
intact x on ice x 2.0°C

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

Custody Seals
Intact

REPUBLIC SERVICES, INC.

SPECIAL WASTE PROFILE

Waste Profile #

Requested Disposal Facility: Southwest Regional LF AZ 4755

Sales Rep #.

Saveable fill in form. Restricted printing until all required (yellow) fields are completed.

I. Generator Information

Generator Name: Arizona Department of Environmental Quality
Generator Site Address: 905 W. Encinas Street
City: Gilbert | County: Maricopa | State: Arizona | Zip: 85251
State ID/Reg No: | State Approval/Waste Code: (if applicable) | NAICS # :
Generator Mailing Address (if different): 1110 W. Washington Street
City: Phoenix | County: Maricopa | State: Arizona | Zip: 85007
Generator Contact Name: Scott Goodwin R.G. | Email:
Phone Number: (602) 771-4452 | Ext: | Fax Number: 771-4238

IIa. Transporter Information

Transporter Name: Environmental Response, Inc | Contact Name: Daniel Olivas
Transporter Address: 2202 W. Medtronic Way, Suite 108
City: Tempe | County: Maricopa | State: Arizona | Zip: 85281
Phone Number: (480) 967-2 | Fax Number: (480) 967-2735 | State Transportation Number: AZ0000303032

IIb. Billing Information

Bill To: Environmental Response, Inc | Contact Name: Accounts Payable
Billing Address: 2202 W. Medtronic Way, Suite 108 | Email:
City: Tempe | State: Arizona | Zip: 85281 | Phone: (480) 967-2802

III. Waste Stream Information

Name of Waste: Non-Regulated Materials (Drill Cuttings)

Process Generating Waste:

Soil collected from drilling operations

Physical State: ☑ SOLID ☐ SEMI-SOLID ☐ POWDER ☐ LIQUID
Method of Shipment: ☑ BULK ☐ DRUM ☐ BAGGED ☐ OTHER:
Estimated Annual Volume: 70 Tons
Frequency: ☑ ONE TIME ☐ ANNUAL
Disposal Consideration: ☑ LANDFILL ☐ SOLIDIFICATION ☐ BIOREMEDIATION

IV. Representative Sample Certification

☐ NO SAMPLE TAKEN

Is the representative sample collected to prepare this profile and laboratory analysis, collected in accordance with U.S. EPA 40 CFR 261.20(c) guidelines or equivalent rules? ☑ YES or ☐ NO

Sample Date: 6/24/11 | Type of Sample: ☑ COMPOSITE SAMPLE ☐ GRAB SAMPLE
Sample ID Numbers: IDW Roll-Off # 96011 and IDW Roll-Off # 96012

SPECIAL WASTE PROFILE (continued)

Waste Profile #

V. Physical Characteristics of Waste

Characteristic Components	% by Weight (range)
1. Soil	100.000
2.	
3.	
4.	
5.	

Color	Odor (describe)	Does Waste Contain Free Liquids?	% Solids	pH:	Flash Point
Brown	None	☐ Yes or ☑ No	100.00	N/A	N/A °F

Attach Laboratory Analytical Report (and/or Material Safety Data Sheet) Including Chain of Custody and Required Parameters Provided for this Profile

Does this waste or generating process contain regulated concentrations of the following Pesticides and/or Herbicides: Chlordane, Endrin, Heptachlor (and it epoxides), Lindane, Methoxychlor, Toxaphene, 2,4-D, or 2,4,5-TP Silvex as defined in 40 CFR 261.33?	☐ Yes or ☑ No
Does this waste contain reactive sulfides (greater than 500 ppm) or reactive cyanide (greater than 250 ppm) [reference 40 CFR 261.23(a)(5)]?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of Polychlorinated Biphenyls (PCBs) as defined in 40 CFR Part 761?	☐ Yes or ☑ No
Does this waste contain concentrations of listed hazardous wastes defined in 40 CFR 261.31, 261.32, 261.33, including RCRA F-Listed Solvents?	☐ Yes or ☑ No
Does this waste exhibit a Hazardous Characteristic as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCCD), or any other dioxin as defined in 40 CFR 261.31?	☐ Yes or ☑ No
Is this a regulated Radioactive Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this a regulated Medical or Infectious Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this waste a reactive or heat generating waste?	☐ Yes or ☑ No
Does the waste contain sulfur or sulfur by-products?	☐ Yes or ☑ No
Is this waste generated at a Federal Superfund Clean Up Site?	☐ Yes or ☑ No
Is this waste from a TSD facility, TSD-like facility or waste consolidator?	☐ Yes or ☑ No

VI. Certification

I hereby certify that to the best of my knowledge and belief, the information contained herein is a true, complete and accurate description of the waste material being offered for disposal and all known or suspected hazards have been disclosed. All Analytical Results/Material Safety Data Sheets submitted are truthful and complete and are representative of the waste.

I further certify that by utilizing this profile, neither I nor any other employee of the company will deliver for disposal or attempt to deliver for disposal any waste which is classified as toxic waste, hazardous waste or infectious waste, or any other waste material this facility is prohibited from accepting by law. I shall immediately give written notice of any change or condition pertaining to the waste not provided herein. Our company hereby agrees to fully indemnify this disposal facility against any damages resulting from this certification being inaccurate or untrue.

I further certify that the company has not altered the form or content of this profile sheet as provided by Republic Services Inc.

Scott Goodwin for ADEQ
Authorized Representative Name/Title (Type or Print)

Arizona Department of Environmental Quality
Company Name

Scott Goodwin for ADEQ
Authorized Representative Signature

07/11/2011
Date

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. **Waste Tracking Number**: 139305-1

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

GENERATOR

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non Regulated Material, Solid, (Soil Borings)	1	CM	15	T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin #52739
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scot Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: M LUCATORTO
Signature: M Lucatorto
Month Day Year: 10 23 23

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: John [illegible]
Signature:
Month Day Year: 10 23 23

DESIGNATED FACILITY TO GENERATOR

SITE
A J LANDFILL
Apache Junction, AZ 85119 480-982-7003

CUSTOMER
000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE: 75
TICKET #: 938760
CELL:
WEIGHMASTER: Joan L.
DATE/TIME IN: 10-23-2013 1:37 pm
DATE/TIME OUT: 10-23-2013 1:37 pm
VEHICLE: SS3052
CONTAINER:
REFERENCE: INVOICE
BILL OF LADING:

MANUAL IN	GROSS WEIGHT	67,100	NET TONS	16.13	
TARE OUT	TARE WEIGHT	34,840	NET WEIGHT	32,260	INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
16.13	TN	SW-CONT SOIL				

NET AMOUNT

TENDERED

CHANGE

CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

SIGNATURE ____________________

RS-F042UPR (07/12)

15664049

A.J. Landfill

55305020

#409

ERI

SITE	TICKET	GRID
WEIGHMASTER		
DATE IN 10/23/13		TIME IN
DATE OUT		TIME OUT
VEHICLE		ROLL OFF
REFERENCE	ORIGIN	

4752-13-16144

QTY	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
		Gross 67100 Tare 30440				

NET AMOUNT

TENDERED

CHANGE

CHECK NO.

REPUBLIC SERVICES

REV 11/09

SIGNATURE

RS-F04

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. Waste Tracking Number: 139305-5

GENERATOR

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1. Non Regulated Material, Solid, (Soil Borings)	1	CM	15	T	
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin #96009
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scot Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month 10 Day 25 Year 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JUSTIN THOMPSON
Signature:
Month 10 Day 25 Year 13

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Joan Artz
Signature:
Month 11 Day 5 Year 13

DESIGNATED FACILITY TO GENERATOR

SITE
A J LANDFILL
Apache Junction, AZ 85119 480-982-7003

CUSTOMER
000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE 75
TICKET # 942135
CELL
WEIGHMASTER Joan L.
DATE/TIME IN 11-05-2013 6:00 am
DATE/TIME OUT 11-5-2013 6:29 am
VEHICLE SS304C20
CONTAINER
REFERENCE
BILL OF LADING INVOICE

SCALE IN GROSS WEIGHT 65,300 NET TONS 14.11
TARE OUT TARE WEIGHT 37,080 NET WEIGHT 28,220 INBOUND

QTY.	UNIT	OESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
14.11	TN	SW-CONT SOIL				

NET AMOUNT
TENDERED
CHANGE
CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

SIGNATURE ____________

RS-F042UPR (07/12)

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

GENERATOR

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG

2. Page 1 of: 1

3. Emergency Response Phone: 800-535-5053

4. Waste Tracking Number: 139305-2

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.
	No.	Type		
1. Non Regulated Material, Solid, (Soil Borings)	1	CM		T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin #56114
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: M. LUCATORTA
Signature: M Lucatorta
Month Day Year: 10 25 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Jean 6213
Signature
Month Day Year: 10 28 13

GC Labels • Printed in the USA
1-800-997-6966

DESIGNATED FACILITY TO GENERATOR

Reorder Part# MANIFEST-C6NHWC
913-897-6966

SITE
A J LANDFILL
Apache Junction, AZ 85119 480-982-7003

CUSTOMER
000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE 75
TICKET # 939806
CELL
WEIGHMASTER Joan L.
DATE/TIME IN 10-28-2013 6:36 am
DATE/TIME OUT 10-28-2013 6:36 am
VEHICLE SS3052
CONTAINER
REFERENCE INVOICE
BILL OF LADING

SCALE IN	GROSS WEIGHT	46,180	NET TONS	5.67		
TARE OUT	TARE WEIGHT	34,840	NET WEIGHT	11,340		INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
5.67	TN	SW-CONT SOIL				

NET AMOUNT
TENDERED
CHANGE
CHECK#

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SIGNATURE ____________________

RS-F042UPR (07/12)

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of 1
3. Emergency Response Phone: 800-535-5053
4. **Waste Tracking Number** 139305-8

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non Regulated Material, Solid, (Soil Borings)	1	CM		T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin #52742
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month Day Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: M Lucatotta
Signature:
Month Day Year: 10 25 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Craig Hicks
Signature:
Month Day Year: 10 25 13

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

SITE

A J LANDFILL

Apache Junction, AZ 85119 480-982-7003

CUSTOMER

000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE 75

TICKET # 939516

CELL

WEIGHMASTER Craig H.

DATE/TIME IN 10-25-2013 2:26 pm

DATE/TIME OUT 10-25-2013 2:26 pm

VEHICLE SS3052

CONTAINER

REFERENCE

BILL OF LADING INVOICE

SCALE IN	GROSS WEIGHT	60,060	NET TONS	12.61	
TARE OUT	TARE WEIGHT	34,840	NET WEIGHT	25,220	INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
12.61	TN	SW-CONT SOIL				

NET AMOUNT

TENDERED

CHANGE

CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

RS-F042UPR (07/12)

SIGNATURE

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. **Waste Tracking Number**: 139305-6

5. Generator's Name and Mailing Address:
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007

Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address):
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address:
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219

Facility's Phone: 480-982-7003

U.S. EPA ID Number: Not Required

GENERATOR

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non Regulated Material, Solid, (Soil Borings)	1	CM	17.5	T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin # 139B
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month 10 Day 26 Year 13

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JUSTIN THOMPSON
Signature:
Month 10 Day 26 Year 13

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: CRAIG HICKS
Signature:
Month 10 Day 26 Year 13

SITE
A J LANDFILL
Apache Junction, AZ 85119 480-982-7003

CUSTOMER
000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE 75
TICKET # 939742
CELL
WEIGHMASTER Craig H.
DATE/TIME IN 10-26-2013 1:29 pm
DATE/TIME OUT 10-26-2013 1:29 pm
VEHICLE SS304C20
CONTAINER
REFERENCE INVOICE
BILL OF LADING

SCALE IN	GROSS WEIGHT	71,540	NET TONS	17.44	
MANUAL OUT	TARE WEIGHT	36,660	NET WEIGHT	34,880	INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
17.44	TN	SW-CONT SOIL				

NET AMOUNT
TENDERED
CHANGE
CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

SIGNATURE

RS-F042UPR (07/12) 2/21

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. Waste Tracking Number: 139305-3

GENERATOR

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non Regulated Material, Solid, (Soil Borings)	1	CM		T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin #56/06
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: M. LUCATORTA
Signature: M Lucatorto
Month Day Year: 11 02 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Tiffany Snow
Signature:
Month Day Year: 11 2 13

SITE
A J LANDFILL
Apache Junction, AZ 85119 480-982-7003

CUSTOMER
000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE: 75
TICKET #: 941513
CELL:
WEIGHMASTER: Tiffany S.
DATE/TIME IN: 11-02-2013 6:24 am
DATE/TIME OUT: 11-2-2013 6:24 am
VEHICLE: SS305020
CONTAINER:
REFERENCE:
INVOICE
BILL OF LADING:

SCALE IN	GROSS WEIGHT	64,600	NET TONS	15.01	
TARE OUT	TARE WEIGHT	34,580	NET WEIGHT	30,020	INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
15.01	TN	SW-CONT SOIL				

NET AMOUNT
TENDERED
CHANGE
CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

RS-F042UPR (07/12)

SIGNATURE

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: AZCESQG
2. Page 1 of: 1
3. Emergency Response Phone: 800-535-5053
4. Waste Tracking Number: 139305-4

GENERATOR

5. Generator's Name and Mailing Address
ADEQ - Attn: Scott Goodwin -
1110 W. Washington St.
Phoenix, AZ 85007
Generator's Phone: 602 771-4452

Generator's Site Address (if different than mailing address)
ADEQ Cooper and Comme:
Cooper Road and Commerce Ave
Gilbert, AZ 85233

6. Transporter 1 Company Name: Environmental Response Inc.
U.S. EPA ID Number: AZ0000303032

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Apache Junction Landfill
4050 S Tomahawk Rd.
Apache Junction, AZ 85219
Facility's Phone: 480-982-7003
U.S. EPA ID Number: Not Required

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non Regulated Material, Solid, (Soil Borings)	1	CM		T
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
1) WP# 4752-13-16144, Bin # 56108
ER Phone Chemtrec 800-535-5053, CD Required, ERI# 20-139305-7

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Scott Goodwin for ADEQ
Signature: Scott Goodwin for ADEQ
Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: M. LUCATORTA
Signature: M Lucatorta
Month Day Year: 11 08 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Tiffany Snow
Signature:
Month Day Year: 11 2 13

DESIGNATED FACILITY TO GENERATOR

SITE

A J LANDFILL

Apache Junction, AZ 85119 480-982-7003

CUSTOMER

000409
ENVIROMENTAL RESPONSE
2202 W MEDTRONICS WAY #108
TEMPE, AZ 85281
#47521316144

SITE: 75
TICKET #: 941547
CELL:
WEIGHMASTER: Tiffany S.
DATE/TIME IN: 11-02-2013 8:53 am
DATE/TIME OUT: 11-2-2013 8:53 am
VEHICLE: SS305020
CONTAINER:
REFERENCE:
BILL OF LADING: INVOICE

SCALE IN	GROSS WEIGHT	55,920	NET TONS	10.67	
TARE OUT	TARE WEIGHT	34,580	NET WEIGHT	21,340	INBOUND

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	TRACKING QTY				
10.67	TN	SW-CONT SOIL				

NET AMOUNT:
TENDERED:
CHANGE:
CHECK#:

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

RS-F042UPR (07/12)

SIGNATURE

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Phoenix
4625 East Cotton Ctr Blvd
Suite 189
Phoenix, AZ 85040
Tel: (602)437-3340

TestAmerica Job ID: 550-10102-1
Client Project/Site: 2010002.60.SPS

For:
Hydro Geo Chem
6340 East Thomas Road, Suite 228
Scottsdale, Arizona 85251-7056

Attn: Steve Sutherland

Authorized for release by:
9/18/2013 3:25:54 PM

Linda Eshelman, Project Manager II
linda.eshelman@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
L5	The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.
R1	RPD/RSD exceeded the method acceptance limit. See case narrative.
R6	LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
N1	See case narrative.
V1	CCV recovery was above method acceptance limits. The analyte was not detected in the sample.
R4	MS/MSD RPD exceeded the method control limit. Recovery met acceptance criteria.
R13	MS/MSD RPD exceeded the method acceptance limit. Matrix spike recovery was outside acceptance criteria. Batch precision and accuracy were demonstrated.

GC Semi VOA

Qualifier	Qualifier Description
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample,
S4	Surrogate recovery was above laboratory acceptance limits and method acceptance limits. No target analytes were detected in the sample.

Metals

Qualifier	Qualifier Description
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
R13	MS/MSD RPD exceeded the method acceptance limit. Matrix spike recovery was outside acceptance criteria. Batch precision and accuracy were demonstrated.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Job ID: 550-10102-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-10102-1

Comments
No additional comments.

Receipt
The sample was received on 9/6/2013 1:32 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1° C.

GC/MS VOA
Method(s) 8260B: The continuing calibration verification (CCV) for analytical batch 14855 recovered outside control limits for Acetone and Trichlorofluoromethane. The data has been qualified and reported.

Method(s) 8260B: The initial calibration verification (ICV) for analytical batch 14855 was outside control criteria for Acetone high. The samples were non detect for these compounds thereforet the data is not impacted.. The data have been qualified wth an N1 and reported.

Method(s) 8260B: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for batch 14974 recovered outside control limits for the following analytes: Chloroform , 1,1-Dichloroethane , Vinyl acetate , Isopropylbenzene and 1,1,1-Trichloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data has been reported.

Method(s) 8260B: The initial calibration verification (ICV) for analytical batch 14855 was outside control criteria for Vinyl Acetate. The data have been qualified and reported.

Method(s) 8260B: Chloroform and 1,1-Dichloroethane recovered above laboratory acceptance criteria in the LCSD. These compounds were also above laboratory acceptance criteria for RPD. Both compounds were ND is the associated samples. Data has been flagged with a R1 qualifier.

Method(s) 8260B: Vinyl Acetate recovered above laboratory acceptance criteria in the LCS/LCSD/MS/MSD. There were no hits in the associated samples. The LCS/LCSD and samples have been flagged with a L5 qualifier. The MS/MSD and source sample have been qualified with a N1 qualifier.

No other analytical or quality issues were noted.

HPLC
No analytical or quality issues were noted.

GC Semi VOA
No analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

VOA Prep
No analytical or quality issues were noted.

Sample Summary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-10102-1	IDW	Soil	09/05/13 14:30	09/06/13 13:32

Detection Summary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Client Sample ID: IDW **Lab Sample ID: 550-10102-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	10		5.0		mg/Kg	1		6010B	Total/NA
Barium	63		5.0		mg/Kg	1		6010B	Total/NA
Chromium	16		2.0		mg/Kg	1		6010B	Total/NA
Paint Filter	Negative				NONE	1		9095B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

Client Sample ID: IDW

Lab Sample ID: 550-10102-1

Date Collected: 09/05/13 14:30
Matrix: Soil
Date Received: 09/06/13 13:32

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1,1-Trichloroethane	ND	L5	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1,2,2-Tetrachloroethane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1,2-Trichloroethane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1-Dichloroethane	ND	L5 R1	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1-Dichloroethene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,1-Dichloropropene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2,3-Trichlorobenzene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2,3-Trichloropropane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2,4-Trichlorobenzene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2,4-Trimethylbenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2-Dibromo-3-Chloropropane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2-Dibromoethane (EDB)	ND		25		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2-Dichloroethane	ND	R6	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,2-Dichloropropane	ND	R6	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,3,5-Trimethylbenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,3-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,3-Dichloropropane	ND	M1	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
1,4-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
2,2-Dichloropropane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
2-Butanone (MEK)	ND		500		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
2-Chlorotoluene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
2-Hexanone	ND		500		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
4-Chlorotoluene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
4-Methyl-2-pentanone (MIBK)	ND		500		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Acetone	ND	M1 N1 V1	990		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Benzene	ND		50		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Bromobenzene	ND	R6	250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Bromochloromethane	ND	R6	250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Bromodichloromethane	ND	M1	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Bromoform	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Bromomethane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Carbon disulfide	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Carbon tetrachloride	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Chlorobenzene	ND		50		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Chloroethane	ND	R6	250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Chloroform	ND	L5 R1	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Chloromethane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
cis-1,2-Dichloroethene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
cis-1,3-Dichloropropene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Chlorodibromomethane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Dibromomethane	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Dichlorodifluoromethane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Ethylbenzene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Hexachlorobutadiene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Iodomethane	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Isopropylbenzene	ND	L5	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
m,p-Xylenes	ND		150		ug/Kg		09/06/13 14:36	09/10/13 00:10	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: IDW
Date Collected: 09/05/13 14:30
Date Received: 09/06/13 13:32

Lab Sample ID: 550-10102-1
Matrix: Soil

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND	R6	500		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Methyl tert-butyl ether	ND	M1	50		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Naphthalene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
n-Butylbenzene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
n-Propylbenzene	ND	R6	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
o-Xylene	ND		150		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
p-Isopropyltoluene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
sec-Butylbenzene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Styrene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
tert-Butylbenzene	ND		250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Tetrachloroethene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Toluene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
trans-1,2-Dichloroethene	ND	R6	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
trans-1,3-Dichloropropene	ND		99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Trichloroethene	ND	M1	99		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Trichlorofluoromethane	ND	V1	250		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Vinyl acetate	ND	L5 N1	1200		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Vinyl chloride	ND	R6	50		ug/Kg		09/06/13 14:36	09/10/13 00:10	1
Xylenes, Total	ND		300		ug/Kg		09/06/13 14:36	09/10/13 00:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*97*		*34.7 - 143*	*09/06/13 14:36*	*09/10/13 00:10*	*1*
Toluene-d8 (Surr)	*95*		*39.1 - 145*	*09/06/13 14:36*	*09/10/13 00:10*	*1*
4-Bromofluorobenzene (Surr)	*94*		*38.2 - 149*	*09/06/13 14:36*	*09/10/13 00:10*	*1*

Method: 8015 AZ R1 - Arizona - Total Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C22)	ND	V1	30		mg/Kg		09/11/13 08:42	09/13/13 07:03	1
ORO (C22-C32)	ND	V1	99		mg/Kg		09/11/13 08:42	09/13/13 07:03	1
Total Fuel Hydrocarbons (C10-C32)	ND		130		mg/Kg		09/11/13 08:42	09/13/13 07:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*134*	*S4*	*70 - 130*	*09/11/13 08:42*	*09/13/13 07:03*	*1*

Method: 8310 - PAHs (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.033		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Acenaphthylene	ND		0.16		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Anthracene	ND		0.022		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Benzo[a]anthracene	ND		0.0039		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Benzo[a]pyrene	ND		0.0030		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Benzo[b]fluoranthene	ND		0.0059		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Benzo[g,h,i]perylene	ND		0.0099		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Benzo[k]fluoranthene	ND		0.0059		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Chrysene	ND		0.0049		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Dibenz(a,h)anthracene	ND		0.0099		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Fluoranthene	ND		0.0069		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Fluorene	ND		0.0099		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Indeno[1,2,3-cd]pyrene	ND		0.0099		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Naphthalene	ND		0.033		mg/Kg		09/09/13 13:55	09/11/13 02:55	1

Client Sample ID: IDW
Lab Sample ID: 550-10102-1
Date Collected: 09/05/13 14:30
Matrix: Soil
Date Received: 09/06/13 13:32

Method: 8310 - PAHs (HPLC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenanthrene	ND		0.0099		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
Pyrene	ND		0.0089		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
1-Methylnaphthalene	ND		0.033		mg/Kg		09/09/13 13:55	09/11/13 02:55	1
2-Methylnaphthalene	ND		0.033		mg/Kg		09/09/13 13:55	09/11/13 02:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
p-Terphenyl	*81*		*50 - 125*	*09/09/13 13:55*	*09/11/13 02:55*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**10**		5.0		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Barium	**63**		5.0		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Cadmium	ND		0.50		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Chromium	**16**		2.0		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Lead	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Selenium	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 15:09	1
Silver	ND		2.5		mg/Kg		09/10/13 15:37	09/12/13 15:09	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.10		mg/Kg		09/09/13 08:37	09/09/13 13:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Paint Filter	**Negative**				NONE			09/12/13 15:45	1

Surrogate Summary

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Soil **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DBFM (34.7-143)	TOL (39.1-145)	BFB (38.2-149)
550-10102-1	IDW	97	95	94
550-10102-1 MS	IDW	123	125	128
550-10102-1 MSD	IDW	92	96	88

Surrogate Legend

DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DBFM (34.7-143)	TOL (39.1-145)	BFB (38.2-149)
LCS 550-14666/2-A	Lab Control Sample	94	108	97
MB 550-14666/1-A	Method Blank	124	125	126

Surrogate Legend

DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8015 AZ R1 - Arizona - Total Petroleum Hydrocarbons (GC)

Matrix: Soil **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	OTPH (70-130)
550-10102-1	IDW	134 S4

Surrogate Legend

OTPH = o-Terphenyl

Method: 8015 AZ R1 - Arizona - Total Petroleum Hydrocarbons (GC)

Matrix: Solid **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	OTPH (70-130)
550-9768-A-9-C MS	Matrix Spike	93
LCSD 550-14995/3-A	Lab Control Sample Dup	96
MB 550-14995/1-A	Method Blank	94

Surrogate Legend

OTPH = o-Terphenyl

Method: 8310 - PAHs (HPLC)

Matrix: Soil

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PTP2 (50-125)
550-10102-1	IDW	81

Surrogate Legend

PTP = p-Terphenyl

Method: 8310 - PAHs (HPLC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PTP2 (50-125)
550-10027-A-1-D MS	Matrix Spike	83
550-10027-A-1-E MSD	Matrix Spike Duplicate	81
LCS 490-105587/2-A	Lab Control Sample	97
LCSD 490-105587/14-A	Lab Control Sample Dup	85
MB 490-105587/1-A	Method Blank	89

Surrogate Legend

PTP = p-Terphenyl

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 550-14666/1-A
Matrix: Solid
Analysis Batch: 14855

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 14666

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1,1-Trichloroethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1,2,2-Tetrachloroethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1,2-Trichloroethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1-Dichloroethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1-Dichloroethene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,1-Dichloropropene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2,3-Trichlorobenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2,3-Trichloropropane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2,4-Trichlorobenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2,4-Trimethylbenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2-Dibromo-3-Chloropropane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2-Dibromoethane (EDB)	ND		25		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2-Dichloroethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,2-Dichloropropane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,3,5-Trimethylbenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,3-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,3-Dichloropropane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
1,4-Dichlorobenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
2,2-Dichloropropane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
2-Butanone (MEK)	ND		500		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
2-Chlorotoluene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
2-Hexanone	ND		500		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
4-Chlorotoluene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
4-Methyl-2-pentanone (MIBK)	ND		500		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Acetone	ND	N1 V1	990		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Benzene	ND		50		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Bromobenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Bromochloromethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Bromodichloromethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Bromoform	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Bromomethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Carbon disulfide	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Carbon tetrachloride	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Chlorobenzene	ND		50		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Chloroethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Chloroform	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Chloromethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
cis-1,2-Dichloroethene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
cis-1,3-Dichloropropene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Chlorodibromomethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Dibromomethane	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Dichlorodifluoromethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Ethylbenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Hexachlorobutadiene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Iodomethane	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Isopropylbenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 550-14666/1-A
Matrix: Solid
Analysis Batch: 14855

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 14666

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylenes	ND		150		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Methylene Chloride	ND		500		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Methyl tert-butyl ether	ND		50		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Naphthalene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
n-Butylbenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
n-Propylbenzene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
o-Xylene	ND		150		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
p-Isopropyltoluene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
sec-Butylbenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Styrene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
tert-Butylbenzene	ND		250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Tetrachloroethene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Toluene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
trans-1,2-Dichloroethene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
trans-1,3-Dichloropropene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Trichloroethene	ND		99		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Trichlorofluoromethane	ND	V1	250		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Vinyl acetate	ND		1200		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Vinyl chloride	ND		50		ug/Kg		09/06/13 14:16	09/09/13 21:27	1
Xylenes, Total	ND		300		ug/Kg		09/06/13 14:16	09/09/13 21:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*124*		*34.7 - 143*	*09/06/13 14:16*	*09/09/13 21:27*	*1*
Toluene-d8 (Surr)	*125*		*39.1 - 145*	*09/06/13 14:16*	*09/09/13 21:27*	*1*
4-Bromofluorobenzene (Surr)	*126*		*38.2 - 149*	*09/06/13 14:16*	*09/09/13 21:27*	*1*

Lab Sample ID: LCS 550-14666/2-A
Matrix: Solid
Analysis Batch: 14855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	1240	1160		ug/Kg		93	70 - 130
1,1,1-Trichloroethane	1240	1260		ug/Kg		101	67 - 119
1,1,2,2-Tetrachloroethane	1240	1180		ug/Kg		95	62 - 125
1,1,2-Trichloroethane	1240	1140		ug/Kg		92	65 - 125
1,1-Dichloroethane	1240	1030		ug/Kg		83	60 - 112
1,1-Dichloroethene	1240	1130		ug/Kg		91	54 - 118
1,1-Dichloropropene	1240	1200		ug/Kg		97	58 - 120
1,2,3-Trichlorobenzene	1240	1210		ug/Kg		98	70 - 137
1,2,3-Trichloropropane	1240	1190		ug/Kg		96	62 - 129
1,2,4-Trichlorobenzene	1240	1350		ug/Kg		108	70 - 130
1,2,4-Trimethylbenzene	1240	1290		ug/Kg		104	70 - 130
1,2-Dibromo-3-Chloropropane	1240	1360		ug/Kg		109	43 - 136
1,2-Dibromoethane (EDB)	1240	1160		ug/Kg		94	68 - 126
1,2-Dichlorobenzene	1240	1200		ug/Kg		97	70 - 130
1,2-Dichloroethane	1240	1160		ug/Kg		93	67 - 128
1,2-Dichloropropane	1240	1130		ug/Kg		91	64 - 117
1,3,5-Trimethylbenzene	1240	1280		ug/Kg		103	70 - 130

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 550-14666/2-A
Matrix: Solid
Analysis Batch: 14855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,3-Dichlorobenzene	1240	1250		ug/Kg		101	70 - 130
1,3-Dichloropropane	1240	1090		ug/Kg		88	68 - 120
1,4-Dichlorobenzene	1240	1210		ug/Kg		97	70 - 130
2,2-Dichloropropane	1240	1120		ug/Kg		90	65 - 118
2-Butanone (MEK)	1240	1110		ug/Kg		89	42 - 132
2-Chlorotoluene	1240	1260		ug/Kg		101	70 - 130
2-Hexanone	1240	1260		ug/Kg		101	50 - 140
4-Chlorotoluene	1240	1230		ug/Kg		99	70 - 130
4-Methyl-2-pentanone (MIBK)	1240	1230		ug/Kg		99	52 - 129
Acetone	1240	ND	N1 V1	ug/Kg		74	37 - 148
Benzene	1240	1180		ug/Kg		95	67 - 118
Bromobenzene	1240	1090		ug/Kg		88	70 - 130
Bromochloromethane	1240	1060		ug/Kg		85	66 - 124
Bromodichloromethane	1240	1260		ug/Kg		101	69 - 118
Bromoform	1240	1080		ug/Kg		87	59 - 115
Bromomethane	1240	1310		ug/Kg		105	63 - 111
Carbon disulfide	1240	1000		ug/Kg		81	56 - 119
Carbon tetrachloride	1240	1290		ug/Kg		104	65 - 130
Chlorobenzene	1240	1190		ug/Kg		95	70 - 130
Chloroethane	1240	1030		ug/Kg		83	51 - 113
Chloroform	1240	1140		ug/Kg		91	66 - 116
Chloromethane	1240	979		ug/Kg		79	54 - 101
cis-1,2-Dichloroethene	1240	1150		ug/Kg		92	61 - 115
cis-1,3-Dichloropropene	1240	1150		ug/Kg		93	64 - 124
Chlorodibromomethane	1240	1040		ug/Kg		84	61 - 119
Dibromomethane	1240	1180		ug/Kg		95	67 - 124
Dichlorodifluoromethane	1240	856		ug/Kg		69	29 - 90
Ethylbenzene	1240	1300		ug/Kg		105	68 - 124
Hexachlorobutadiene	1240	1420		ug/Kg		114	71 - 140
Iodomethane	1240	1080		ug/Kg		87	70 - 130
Isopropylbenzene	1240	1410		ug/Kg		114	70 - 130
m,p-Xylenes	1240	1260		ug/Kg		101	64 - 122
Methylene Chloride	1240	973		ug/Kg		78	61 - 117
Methyl tert-butyl ether	1240	1090		ug/Kg		87	57 - 126
Naphthalene	1240	1190		ug/Kg		96	57 - 147
n-Butylbenzene	1240	1350		ug/Kg		109	64 - 131
n-Propylbenzene	1240	1340		ug/Kg		108	68 - 132
o-Xylene	1240	1250		ug/Kg		101	70 - 130
p-Isopropyltoluene	1240	1250		ug/Kg		101	67 - 122
sec-Butylbenzene	1240	1300		ug/Kg		105	66 - 127
Styrene	1240	1260		ug/Kg		102	67 - 121
tert-Butylbenzene	1240	1300		ug/Kg		104	70 - 130
Tetrachloroethene	1240	1240		ug/Kg		100	65 - 124
Toluene	1240	1290		ug/Kg		104	68 - 122
trans-1,2-Dichloroethene	1240	1060		ug/Kg		85	59 - 115
trans-1,3-Dichloropropene	1240	1240		ug/Kg		99	64 - 123
Trichloroethene	1240	1410		ug/Kg		113	68 - 117
Trichlorofluoromethane	1240	1600	V1	ug/Kg		129	63 - 139

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 550-14666/2-A
Matrix: Solid
Analysis Batch: 14855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 14666

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl acetate			1240	5830	L5	ug/Kg		469	51 - 134
Vinyl chloride			1240	998		ug/Kg		80	10 - 99
Xylenes, Total			2490	2510		ug/Kg		101	70 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dibromofluoromethane (Surr)	*94*		*34.7 - 143*
Toluene-d8 (Surr)	*108*		*39.1 - 145*
4-Bromofluorobenzene (Surr)	*97*		*38.2 - 149*

Lab Sample ID: 550-10102-1 MS
Matrix: Soil
Analysis Batch: 14855

Client Sample ID: IDW
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	ND		1240	1470		ug/Kg		118	52 - 122
1,1,1-Trichloroethane	ND	L5	1240	1430		ug/Kg		115	50 - 119
1,1,2,2-Tetrachloroethane	ND		1240	1430		ug/Kg		115	41 - 132
1,1,2-Trichloroethane	ND		1240	1520		ug/Kg		122	47 - 128
1,1-Dichloroethane	ND	L5 R1	1240	1190		ug/Kg		96	46 - 111
1,1-Dichloroethene	ND		1240	1180		ug/Kg		95	36 - 114
1,1-Dichloropropene	ND		1240	1200		ug/Kg		96	45 - 117
1,2,3-Trichlorobenzene	ND		1240	1560		ug/Kg		126	41 - 150
1,2,3-Trichloropropane	ND		1240	1550		ug/Kg		125	51 - 129
1,2,4-Trichlorobenzene	ND		1240	1610		ug/Kg		130	43 - 150
1,2,4-Trimethylbenzene	ND		1240	1390		ug/Kg		112	42 - 137
1,2-Dibromo-3-Chloropropane	ND		1240	1510		ug/Kg		122	27 - 140
1,2-Dibromoethane (EDB)	ND		1240	1560		ug/Kg		126	49 - 130
1,2-Dichlorobenzene	ND		1240	1370		ug/Kg		110	54 - 130
1,2-Dichloroethane	ND	R6	1240	1530		ug/Kg		123	53 - 124
1,2-Dichloropropane	ND	R6	1240	1260		ug/Kg		102	48 - 118
1,3,5-Trimethylbenzene	ND		1240	1420		ug/Kg		115	50 - 131
1,3-Dichlorobenzene	ND		1240	1420		ug/Kg		115	56 - 127
1,3-Dichloropropane	ND	M1	1240	1550	M1	ug/Kg		125	50 - 124
1,4-Dichlorobenzene	ND		1240	1360		ug/Kg		109	52 - 128
2,2-Dichloropropane	ND		1240	1120		ug/Kg		91	47 - 117
2-Butanone (MEK)	ND		1240	1420		ug/Kg		115	32 - 130
2-Chlorotoluene	ND		1240	1350		ug/Kg		109	54 - 123
2-Hexanone	ND		1240	1640		ug/Kg		132	32 - 144
4-Chlorotoluene	ND		1240	1340		ug/Kg		108	56 - 123
4-Methyl-2-pentanone (MIBK)	ND		1240	1550		ug/Kg		125	37 - 134
Acetone	ND	M1 N1 V1	1240	1930	M1 N1 V1	ug/Kg		155	32 - 148
Benzene	ND		1240	1320		ug/Kg		107	51 - 118
Bromobenzene	ND	R6	1240	1290		ug/Kg		104	58 - 127
Bromochloromethane	ND	R6	1240	1330		ug/Kg		107	50 - 123
Bromodichloromethane	ND	M1	1240	1560	M1	ug/Kg		126	51 - 122
Bromoform	ND		1240	1290		ug/Kg		104	45 - 115
Bromomethane	ND		1240	1280		ug/Kg		103	28 - 115
Carbon disulfide	ND		1240	1000		ug/Kg		81	32 - 116

QC Sample Results

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 550-10102-1 MS
Matrix: Soil
Analysis Batch: 14855

Client Sample ID: IDW
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon tetrachloride	ND		1240	1380		ug/Kg		111	48 - 128
Chlorobenzene	ND		1240	1420		ug/Kg		114	57 - 122
Chloroethane	ND	R6	1240	1110		ug/Kg		90	32 - 107
Chloroform	ND	L5 R1	1240	1410		ug/Kg		114	52 - 116
Chloromethane	ND		1240	1000		ug/Kg		81	28 - 100
cis-1,2-Dichloroethene	ND		1240	1330		ug/Kg		107	47 - 113
cis-1,3-Dichloropropene	ND		1240	1480		ug/Kg		119	41 - 130
Chlorodibromomethane	ND		1240	1360		ug/Kg		109	44 - 122
Dibromomethane	ND		1240	1480		ug/Kg		120	49 - 128
Dichlorodifluoromethane	ND		1240	704		ug/Kg		57	10 - 73
Ethylbenzene	ND		1240	1430		ug/Kg		115	50 - 130
Hexachlorobutadiene	ND		1240	1580		ug/Kg		127	33 - 150
Iodomethane	ND		1240	1190		ug/Kg		96	39 - 147
Isopropylbenzene	ND	L5	1240	1480		ug/Kg		120	59 - 143
m,p-Xylenes	ND		1240	1450		ug/Kg		117	43 - 128
Methylene Chloride	ND	R6	1240	1320		ug/Kg		106	45 - 115
Methyl tert-butyl ether	ND	M1	1240	1560	M1	ug/Kg		126	41 - 125
Naphthalene	ND		1240	1540		ug/Kg		124	34 - 150
n-Butylbenzene	ND		1240	1460		ug/Kg		118	44 - 140
n-Propylbenzene	ND	R6	1240	1390		ug/Kg		112	52 - 135
o-Xylene	ND		1240	1530		ug/Kg		123	48 - 127
p-Isopropyltoluene	ND		1240	1330		ug/Kg		107	51 - 126
sec-Butylbenzene	ND		1240	1360		ug/Kg		110	49 - 131
Styrene	ND		1240	1520		ug/Kg		123	49 - 123
tert-Butylbenzene	ND		1240	1410		ug/Kg		114	54 - 130
Tetrachloroethene	ND		1240	1430		ug/Kg		115	49 - 124
Toluene	ND		1240	1440		ug/Kg		116	52 - 126
trans-1,2-Dichloroethene	ND	R6	1240	1160		ug/Kg		94	44 - 113
trans-1,3-Dichloropropene	ND		1240	1580		ug/Kg		128	43 - 130
Trichloroethene	ND	M1	1240	1550	M1	ug/Kg		125	53 - 120
Trichlorofluoromethane	ND	V1	1240	1510	V1	ug/Kg		122	33 - 134
Vinyl acetate	ND	L5 N1	1240	5690	N1	ug/Kg		459	10 - 126
Vinyl chloride	ND	R6	1240	936		ug/Kg		75	10 - 82
Xylenes, Total	ND		2480	2980		ug/Kg		120	57 - 122

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dibromofluoromethane (Surr)	*123*		*34.7 - 143*
Toluene-d8 (Surr)	*125*		*39.1 - 145*
4-Bromofluorobenzene (Surr)	*128*		*38.2 - 149*

Lab Sample ID: 550-10102-1 MSD
Matrix: Soil
Analysis Batch: 14855

Client Sample ID: IDW
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND		1250	1030		ug/Kg		83	52 - 122	35	36
1,1,1-Trichloroethane	ND	L5	1250	1080		ug/Kg		86	50 - 119	28	29
1,1,2,2-Tetrachloroethane	ND		1250	1110		ug/Kg		89	41 - 132	25	37

QC Sample Results

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 550-10102-1 MSD
Matrix: Soil
Analysis Batch: 14855

Client Sample ID: IDW
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,2-Trichloroethane	ND		1250	1060	R4	ug/Kg		85	47 - 128	35	34
1,1-Dichloroethane	ND	L5 R1	1250	912		ug/Kg		73	46 - 111	26	26
1,1-Dichloroethene	ND		1250	930		ug/Kg		75	36 - 114	23	32
1,1-Dichloropropene	ND		1250	1020		ug/Kg		82	45 - 117	16	29
1,2,3-Trichlorobenzene	ND		1250	1130		ug/Kg		90	41 - 150	33	38
1,2,3-Trichloropropane	ND		1250	1190		ug/Kg		95	51 - 129	26	40
1,2,4-Trichlorobenzene	ND		1250	1140		ug/Kg		92	43 - 150	34	36
1,2,4-Trimethylbenzene	ND		1250	1100		ug/Kg		88	42 - 137	24	40
1,2-Dibromo-3-Chloropropane	ND		1250	1230		ug/Kg		99	27 - 140	20	40
1,2-Dibromoethane (EDB)	ND		1250	1060		ug/Kg		85	49 - 130	38	39
1,2-Dichlorobenzene	ND		1250	1060		ug/Kg		85	54 - 130	25	38
1,2-Dichloroethane	ND	R6	1250	1040	R4	ug/Kg		83	53 - 124	38	32
1,2-Dichloropropane	ND	R6	1250	925	R4	ug/Kg		74	48 - 118	31	30
1,3,5-Trimethylbenzene	ND		1250	1110		ug/Kg		89	50 - 131	24	36
1,3-Dichlorobenzene	ND		1250	1090		ug/Kg		87	56 - 127	27	33
1,3-Dichloropropane	ND	M1	1250	965	R4	ug/Kg		77	50 - 124	46	35
1,4-Dichlorobenzene	ND		1250	1050		ug/Kg		84	52 - 128	26	33
2,2-Dichloropropane	ND		1250	907		ug/Kg		73	47 - 117	21	27
2-Butanone (MEK)	ND		1250	717	R4	ug/Kg		58	32 - 130	66	40
2-Chlorotoluene	ND		1250	1110		ug/Kg		89	54 - 123	20	33
2-Hexanone	ND		1250	1060	R4	ug/Kg		85	32 - 144	43	40
4-Chlorotoluene	ND		1250	1090		ug/Kg		87	56 - 123	20	32
4-Methyl-2-pentanone (MIBK)	ND		1250	1130		ug/Kg		90	37 - 134	32	40
Acetone	ND	M1 N1 V1	1250	ND	N1 R4 V1	ug/Kg		53	32 - 148	98	40
Benzene	ND		1250	980	R4	ug/Kg		79	51 - 118	30	27
Bromobenzene	ND	R6	1250	1040		ug/Kg		83	58 - 127	21	36
Bromochloromethane	ND	R6	1250	939	R4	ug/Kg		75	50 - 123	34	32
Bromodichloromethane	ND	M1	1250	1100	R4	ug/Kg		88	51 - 122	35	33
Bromoform	ND		1250	970		ug/Kg		78	45 - 115	28	39
Bromomethane	ND		1250	924		ug/Kg		74	28 - 115	32	40
Carbon disulfide	ND		1250	788		ug/Kg		63	32 - 116	24	38
Carbon tetrachloride	ND		1250	1130		ug/Kg		90	48 - 128	20	31
Chlorobenzene	ND		1250	1020		ug/Kg		82	57 - 122	33	34
Chloroethane	ND	R6	1250	884		ug/Kg		71	32 - 107	23	40
Chloroform	ND	L5 R1	1250	1020	R4	ug/Kg		81	52 - 116	33	29
Chloromethane	ND		1250	739		ug/Kg		59	28 - 100	30	40
cis-1,2-Dichloroethene	ND		1250	998		ug/Kg		80	47 - 113	29	29
cis-1,3-Dichloropropene	ND		1250	1020	R4	ug/Kg		82	41 - 130	37	34
Chlorodibromomethane	ND		1250	999		ug/Kg		80	44 - 122	30	40
Dibromomethane	ND		1250	1000	R4	ug/Kg		81	49 - 128	38	34
Dichlorodifluoromethane	ND		1250	487		ug/Kg		39	10 - 73	36	40
Ethylbenzene	ND		1250	1080		ug/Kg		87	50 - 130	28	32
Hexachlorobutadiene	ND		1250	1320		ug/Kg		106	33 - 150	18	37
Iodomethane	ND		1250	915		ug/Kg		73	39 - 147	26	40
Isopropylbenzene	ND	L5	1250	1210		ug/Kg		97	59 - 143	20	33
m,p-Xylenes	ND		1250	1110		ug/Kg		89	43 - 128	26	37
Methylene Chloride	ND	R6	1250	840	R4	ug/Kg		67	45 - 115	44	26
Methyl tert-butyl ether	ND	M1	1250	1030	R4	ug/Kg		82	41 - 125	41	35

QC Sample Results

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 550-10102-1 MSD
Matrix: Soil
Analysis Batch: 14855

Client Sample ID: IDW
Prep Type: Total/NA
Prep Batch: 14666

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene	ND		1250	1130		ug/Kg		90	34 - 150	31	34
n-Butylbenzene	ND		1250	1210		ug/Kg		97	44 - 140	19	34
n-Propylbenzene	ND	R6	1250	1170		ug/Kg		94	52 - 135	17	33
o-Xylene	ND		1250	1100		ug/Kg		88	48 - 127	33	39
p-Isopropyltoluene	ND		1250	1080		ug/Kg		86	51 - 126	21	34
sec-Butylbenzene	ND		1250	1140		ug/Kg		91	49 - 131	18	34
Styrene	ND		1250	1130		ug/Kg		90	49 - 123	30	33
tert-Butylbenzene	ND		1250	1150		ug/Kg		92	54 - 130	20	35
Tetrachloroethene	ND		1250	1090		ug/Kg		88	49 - 124	27	32
Toluene	ND		1250	1130		ug/Kg		91	52 - 126	24	30
trans-1,2-Dichloroethene	ND	R6	1250	981		ug/Kg		79	44 - 113	17	26
trans-1,3-Dichloropropene	ND		1250	1050	R4	ug/Kg		85	43 - 130	40	34
Trichloroethene	ND	M1	1250	1130	R4	ug/Kg		90	53 - 120	32	29
Trichlorofluoromethane	ND	V1	1250	1270	V1	ug/Kg		102	33 - 134	17	40
Vinyl acetate	ND	L5 N1	1250	3200	N1 R13	ug/Kg		256	10 - 126	56	40
Vinyl chloride	ND	R6	1250	746		ug/Kg		60	10 - 82	23	40
Xylenes, Total	ND		2500	2210	R4	ug/Kg		89	57 - 122	30	22

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dibromofluoromethane (Surr)	*92*		*34.7 - 143*
Toluene-d8 (Surr)	*96*		*39.1 - 145*
4-Bromofluorobenzene (Surr)	*88*		*38.2 - 149*

Method: 8015 AZ R1 - Arizona - Total Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 550-14995/1-A
Matrix: Solid
Analysis Batch: 15120

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 14995

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C22)	ND	V1	30		mg/Kg		09/11/13 08:42	09/12/13 23:10	1
ORO (C22-C32)	ND	V1	99		mg/Kg		09/11/13 08:42	09/12/13 23:10	1
Total Fuel Hydrocarbons (C10-C32)	ND		130		mg/Kg		09/11/13 08:42	09/12/13 23:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*94*		*70 - 130*	*09/11/13 08:42*	*09/12/13 23:10*	*1*

Lab Sample ID: LCSD 550-14995/3-A
Matrix: Solid
Analysis Batch: 15120

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 14995

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
DRO (C10-C22)			200	206	V1	mg/Kg		103	70 - 130	NaN	20
ORO (C22-C32)			400	392	V1	mg/Kg		98	70 - 130	NaN	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*96*		*70 - 130*

Method: 8015 AZ R1 - Arizona - Total Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: 550-9768-A-9-C MS
Matrix: Solid
Analysis Batch: 15120

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 14995

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (C10-C22)	ND	V1	199	212	V1	mg/Kg		107	56 - 145
ORO (C22-C32)	ND	V1	397	397	V1	mg/Kg		100	77 - 136

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
o-Terphenyl	*93*		*70 - 130*

Method: 8310 - PAHs (HPLC)

Lab Sample ID: MB 490-105587/1-A
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 105587

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.033		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Acenaphthylene	ND		0.17		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Anthracene	ND		0.022		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Benzo[a]anthracene	ND		0.0040		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Benzo[a]pyrene	ND		0.0030		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Benzo[b]fluoranthene	ND		0.0060		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Benzo[g,h,i]perylene	ND		0.010		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Benzo[k]fluoranthene	ND		0.0060		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Chrysene	ND		0.0050		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Dibenz(a,h)anthracene	ND		0.010		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Fluoranthene	ND		0.0070		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Fluorene	ND		0.010		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Indeno[1,2,3-cd]pyrene	ND		0.010		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Naphthalene	ND		0.033		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Phenanthrene	ND		0.010		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
Pyrene	ND		0.0090		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
1-Methylnaphthalene	ND		0.033		mg/Kg		09/09/13 09:09	09/10/13 20:44	1
2-Methylnaphthalene	ND		0.033		mg/Kg		09/09/13 09:09	09/10/13 20:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
p-Terphenyl	*89*		*50 - 125*	*09/09/13 09:09*	*09/10/13 20:44*	*1*

Lab Sample ID: LCS 490-105587/2-A
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 105587

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.0833	0.0737		mg/Kg		88	18 - 120
Acenaphthylene	0.167	ND		mg/Kg		89	35 - 120
Anthracene	0.0833	0.0736		mg/Kg		88	10 - 150
Benzo[a]anthracene	0.0833	0.0761		mg/Kg		91	44 - 120
Benzo[a]pyrene	0.0833	0.0793		mg/Kg		95	35 - 135
Benzo[b]fluoranthene	0.0833	0.0765		mg/Kg		92	53 - 126
Benzo[g,h,i]perylene	0.0833	0.0805		mg/Kg		97	48 - 126

QC Sample Results

Method: 8310 - PAHs (HPLC) (Continued)

Lab Sample ID: LCS 490-105587/2-A
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 105587

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzo[k]fluoranthene			0.0833	0.0766		mg/Kg		92	53 - 120		
Chrysene			0.0833	0.0791		mg/Kg		95	45 - 120		
Dibenz(a,h)anthracene			0.0833	0.0801		mg/Kg		96	52 - 120		
Fluoranthene			0.0833	0.0750		mg/Kg		90	51 - 123		
Fluorene			0.0833	0.0704		mg/Kg		84	39 - 120		
Indeno[1,2,3-cd]pyrene			0.0833	0.0770		mg/Kg		92	46 - 120		
Naphthalene			0.0833	0.0730		mg/Kg		88	15 - 136		
Phenanthrene			0.0833	0.0734		mg/Kg		88	46 - 120		
Pyrene			0.0833	0.0735		mg/Kg		88	38 - 120		
1-Methylnaphthalene			0.0833	0.0856		mg/Kg		103	23 - 140		
2-Methylnaphthalene			0.0833	0.0693		mg/Kg		83	40 - 123		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
p-Terphenyl	*97*		*50 - 125*

Lab Sample ID: LCSD 490-105587/14-A
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 105587

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene			0.0833	0.0597		mg/Kg		72	18 - 120	21	50
Acenaphthylene			0.167	ND		mg/Kg		71	35 - 120	23	50
Anthracene			0.0833	0.0624		mg/Kg		75	10 - 150	17	50
Benzo[a]anthracene			0.0833	0.0668		mg/Kg		80	44 - 120	13	50
Benzo[a]pyrene			0.0833	0.0684		mg/Kg		82	35 - 135	15	50
Benzo[b]fluoranthene			0.0833	0.0672		mg/Kg		81	53 - 126	13	50
Benzo[g,h,i]perylene			0.0833	0.0700		mg/Kg		84	48 - 126	14	50
Benzo[k]fluoranthene			0.0833	0.0671		mg/Kg		81	53 - 120	13	50
Chrysene			0.0833	0.0692		mg/Kg		83	45 - 120	13	50
Dibenz(a,h)anthracene			0.0833	0.0686		mg/Kg		82	52 - 120	16	50
Fluoranthene			0.0833	0.0647		mg/Kg		78	51 - 123	15	50
Fluorene			0.0833	0.0594		mg/Kg		71	39 - 120	17	50
Indeno[1,2,3-cd]pyrene			0.0833	0.0671		mg/Kg		81	46 - 120	14	50
Naphthalene			0.0833	0.0559		mg/Kg		67	15 - 136	25	50
Phenanthrene			0.0833	0.0623		mg/Kg		75	46 - 120	16	50
Pyrene			0.0833	0.0630		mg/Kg		76	38 - 120	15	50
1-Methylnaphthalene			0.0833	0.0633		mg/Kg		76	23 - 140	30	50
2-Methylnaphthalene			0.0833	0.0572		mg/Kg		69	40 - 123	19	50

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
p-Terphenyl	*85*		*50 - 125*

Lab Sample ID: 550-10027-A-1-D MS
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 105587

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acenaphthene	ND		0.0813	0.0702		mg/Kg		86	10 - 123		

Method: 8310 - PAHs (HPLC) (Continued)

Lab Sample ID: 550-10027-A-1-D MS
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 105587

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acenaphthylene	ND		0.163	ND		mg/Kg		69	10 - 155		
Anthracene	ND		0.0813	0.0661		mg/Kg		81	10 - 157		
Benzo[a]anthracene	ND		0.0813	0.0663		mg/Kg		82	20 - 125		
Benzo[a]pyrene	ND		0.0813	0.0691		mg/Kg		85	13 - 135		
Benzo[b]fluoranthene	ND		0.0813	0.0667		mg/Kg		82	15 - 126		
Benzo[g,h,i]perylene	ND		0.0813	0.0692		mg/Kg		85	13 - 136		
Benzo[k]fluoranthene	ND		0.0813	0.0679		mg/Kg		84	18 - 124		
Chrysene	ND		0.0813	0.0712		mg/Kg		88	13 - 138		
Dibenz(a,h)anthracene	ND		0.0813	0.0683		mg/Kg		84	13 - 137		
Fluoranthene	ND		0.0813	0.0663		mg/Kg		82	10 - 140		
Fluorene	ND		0.0813	0.0635		mg/Kg		78	10 - 121		
Indeno[1,2,3-cd]pyrene	ND		0.0813	0.0664		mg/Kg		82	10 - 144		
Naphthalene	ND		0.0813	0.0622		mg/Kg		76	10 - 181		
Phenanthrene	ND		0.0813	0.0673		mg/Kg		76	15 - 133		
Pyrene	ND		0.0813	0.0639		mg/Kg		79	10 - 150		
1-Methylnaphthalene	ND		0.0813	0.0669		mg/Kg		82	10 - 175		
2-Methylnaphthalene	ND		0.0813	0.0585		mg/Kg		NaN	14 - 123		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
p-Terphenyl	*83*		*50 - 125*

Lab Sample ID: 550-10027-A-1-E MSD
Matrix: Solid
Analysis Batch: 106059

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 105587

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	ND		0.0831	0.0801		mg/Kg		96	10 - 123	13	50
Acenaphthylene	ND		0.166	ND		mg/Kg		65	10 - 155	4	50
Anthracene	ND		0.0831	0.0618		mg/Kg		74	10 - 157	8	50
Benzo[a]anthracene	ND		0.0831	0.0679		mg/Kg		82	20 - 125	2	50
Benzo[a]pyrene	ND		0.0831	0.0670		mg/Kg		81	13 - 135	4	50
Benzo[b]fluoranthene	ND		0.0831	0.0662		mg/Kg		80	15 - 126	1	50
Benzo[g,h,i]perylene	ND		0.0831	0.0688		mg/Kg		83	13 - 136	1	50
Benzo[k]fluoranthene	0.0062		0.0831	0.0661		mg/Kg		72	18 - 124	2	50
Chrysene	ND		0.0831	0.0759		mg/Kg		91	13 - 138	6	50
Dibenz(a,h)anthracene	ND		0.0831	0.0677		mg/Kg		81	13 - 137	1	50
Fluoranthene	ND		0.0831	0.0673		mg/Kg		81	10 - 140	2	50
Fluorene	ND		0.0831	0.0641		mg/Kg		77	10 - 121	1	50
Indeno[1,2,3-cd]pyrene	ND		0.0831	0.0661		mg/Kg		80	10 - 144	0	50
Naphthalene	ND		0.0831	0.0711		mg/Kg		86	10 - 181	13	50
Phenanthrene	ND		0.0831	0.0648		mg/Kg		72	15 - 133	4	50
Pyrene	ND		0.0831	0.0655		mg/Kg		79	10 - 150	2	50
1-Methylnaphthalene	ND		0.0831	0.0724		mg/Kg		87	10 - 175	8	50
2-Methylnaphthalene	ND		0.0831	0.0570		mg/Kg		NaN	14 - 123	3	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
p-Terphenyl	*81*		*50 - 125*

QC Sample Results

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 550-14937/1-A
Matrix: Solid
Analysis Batch: 15231

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 14937

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Barium	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Cadmium	ND		0.50		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Chromium	ND		2.0		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Lead	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Selenium	ND		5.0		mg/Kg		09/10/13 15:37	09/12/13 13:55	1
Silver	ND		2.5		mg/Kg		09/10/13 15:37	09/12/13 13:55	1

Lab Sample ID: LCS 550-14937/2-A
Matrix: Solid
Analysis Batch: 15231

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 14937

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	49.6	46.3		mg/Kg		93	81 - 106
Barium	49.6	48.0		mg/Kg		97	86 - 110
Cadmium	49.6	46.7		mg/Kg		94	83 - 105
Chromium	49.6	48.6		mg/Kg		98	87 - 110
Lead	49.6	47.2		mg/Kg		95	84 - 107
Selenium	49.6	46.5		mg/Kg		94	78 - 103
Silver	3.72	3.20		mg/Kg		86	83 - 107

Lab Sample ID: LCSD 550-14937/3-A
Matrix: Solid
Analysis Batch: 15231

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 14937

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	49.8	47.3		mg/Kg		95	81 - 106	2	20
Barium	49.8	49.3		mg/Kg		99	86 - 110	3	20
Cadmium	49.8	47.9		mg/Kg		96	83 - 105	3	20
Chromium	49.8	49.9		mg/Kg		100	87 - 110	3	20
Lead	49.8	47.9		mg/Kg		96	84 - 107	2	20
Selenium	49.8	47.3		mg/Kg		95	78 - 103	2	20
Silver	3.74	3.33		mg/Kg		89	83 - 107	4	20

Lab Sample ID: 550-10193-B-1-B MS
Matrix: Solid
Analysis Batch: 15231

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 14937

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	7.2		49.8	51.1		mg/Kg		88	75 - 125
Barium	110	M2	49.8	146	M2	mg/Kg		62	75 - 125
Cadmium	10		49.8	52.3		mg/Kg		85	75 - 125
Chromium	18		49.8	60.2		mg/Kg		86	75 - 125
Lead	300	M3 R13	49.8	426	M3	mg/Kg		257	75 - 125
Selenium	ND	M2	49.8	37.0	M2	mg/Kg		74	75 - 125
Silver	ND	R13	3.74	4.36		mg/Kg		95	75 - 125

QC Sample Results

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 550-10193-B-1-C MSD
Matrix: Solid
Analysis Batch: 15231

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 14937

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	7.2		49.8	55.1		mg/Kg		96	75 - 125	7	20
Barium	110	M2	49.8	170		mg/Kg		110	75 - 125	15	20
Cadmium	10		49.8	54.8		mg/Kg		90	75 - 125	5	20
Chromium	18		49.8	59.5		mg/Kg		84	75 - 125	1	20
Lead	300	M3 R13	49.8	618	M3 R13	mg/Kg		641	75 - 125	37	20
Selenium	ND	M2	49.8	37.4		mg/Kg		75	75 - 125	1	20
Silver	ND	R13	3.73	5.38	R13	mg/Kg		123	75 - 125	21	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 550-14753/1-A
Matrix: Solid
Analysis Batch: 14829

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 14753

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.098		mg/Kg		09/09/13 08:37	09/09/13 13:00	1

Lab Sample ID: LCS 550-14753/2-A
Matrix: Solid
Analysis Batch: 14829

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 14753

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			1.72	1.60		mg/Kg		93	80 - 120		

Lab Sample ID: LCSD 550-14753/3-A
Matrix: Solid
Analysis Batch: 14829

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 14753

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			1.51	1.42		mg/Kg		95	80 - 120	12	20

Lab Sample ID: 550-9894-A-1-F MS
Matrix: Solid
Analysis Batch: 14829

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 14753

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND		1.57	1.45		mg/Kg		92	75 - 125		

Lab Sample ID: 550-9894-A-1-G MSD
Matrix: Solid
Analysis Batch: 14829

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 14753

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		1.52	1.41		mg/Kg		93	75 - 125	3	20

QC Association Summary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

GC/MS VOA

Prep Batch: 14666

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10102-1	IDW	Total/NA	Soil	5035	
550-10102-1 MS	IDW	Total/NA	Soil	5035	
550-10102-1 MSD	IDW	Total/NA	Soil	5035	
LCS 550-14666/2-A	Lab Control Sample	Total/NA	Solid	5035	
MB 550-14666/1-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 14855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10102-1	IDW	Total/NA	Soil	8260B	14666
550-10102-1 MS	IDW	Total/NA	Soil	8260B	14666
550-10102-1 MSD	IDW	Total/NA	Soil	8260B	14666
LCS 550-14666/2-A	Lab Control Sample	Total/NA	Solid	8260B	14666
MB 550-14666/1-A	Method Blank	Total/NA	Solid	8260B	14666

GC Semi VOA

Prep Batch: 14995

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-9768-A-9-C MS	Matrix Spike	Total/NA	Solid	8015B	
550-10102-1	IDW	Total/NA	Soil	8015B	
LCSD 550-14995/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B	
MB 550-14995/1-A	Method Blank	Total/NA	Solid	8015B	

Analysis Batch: 15120

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-9768-A-9-C MS	Matrix Spike	Total/NA	Solid	8015 AZ R1	14995
550-10102-1	IDW	Total/NA	Soil	8015 AZ R1	14995
LCSD 550-14995/3-A	Lab Control Sample Dup	Total/NA	Solid	8015 AZ R1	14995
MB 550-14995/1-A	Method Blank	Total/NA	Solid	8015 AZ R1	14995

HPLC/IC

Prep Batch: 105587

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10027-A-1-D MS	Matrix Spike	Total/NA	Solid	3550B	
550-10027-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	3550B	
550-10102-1	IDW	Total/NA	Soil	3550B	
LCS 490-105587/2-A	Lab Control Sample	Total/NA	Solid	3550B	
LCSD 490-105587/14-A	Lab Control Sample Dup	Total/NA	Solid	3550B	
MB 490-105587/1-A	Method Blank	Total/NA	Solid	3550B	

Analysis Batch: 106059

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10027-A-1-D MS	Matrix Spike	Total/NA	Solid	8310	105587
550-10027-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8310	105587
550-10102-1	IDW	Total/NA	Soil	8310	105587
LCS 490-105587/2-A	Lab Control Sample	Total/NA	Solid	8310	105587
LCSD 490-105587/14-A	Lab Control Sample Dup	Total/NA	Solid	8310	105587
MB 490-105587/1-A	Method Blank	Total/NA	Solid	8310	105587

QC Association Summary

Metals

Prep Batch: 14753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-9894-A-1-F MS	Matrix Spike	Total/NA	Solid	7471A	
550-9894-A-1-G MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	
550-10102-1	IDW	Total/NA	Soil	7471A	
LCS 550-14753/2-A	Lab Control Sample	Total/NA	Solid	7471A	
LCSD 550-14753/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	
MB 550-14753/1-A	Method Blank	Total/NA	Solid	7471A	

Analysis Batch: 14829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-9894-A-1-F MS	Matrix Spike	Total/NA	Solid	7471A	14753
550-9894-A-1-G MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	14753
550-10102-1	IDW	Total/NA	Soil	7471A	14753
LCS 550-14753/2-A	Lab Control Sample	Total/NA	Solid	7471A	14753
LCSD 550-14753/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	14753
MB 550-14753/1-A	Method Blank	Total/NA	Solid	7471A	14753

Prep Batch: 14937

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10102-1	IDW	Total/NA	Soil	3050B	
550-10193-B-1-B MS	Matrix Spike	Total/NA	Solid	3050B	
550-10193-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	
LCS 550-14937/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 550-14937/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
MB 550-14937/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 15231

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10102-1	IDW	Total/NA	Soil	6010B	14937
550-10193-B-1-B MS	Matrix Spike	Total/NA	Solid	6010B	14937
550-10193-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	6010B	14937
LCS 550-14937/2-A	Lab Control Sample	Total/NA	Solid	6010B	14937
LCSD 550-14937/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	14937
MB 550-14937/1-A	Method Blank	Total/NA	Solid	6010B	14937

General Chemistry

Analysis Batch: 15178

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-10102-1	IDW	Total/NA	Soil	9095B	

Lab Chronicle

Client Sample ID: IDW

Lab Sample ID: 550-10102-1

Date Collected: 09/05/13 14:30

Matrix: Soil

Date Received: 09/06/13 13:32

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			14666	09/06/13 14:36	CDC	TAL PHX
Total/NA	Analysis	8260B		1	14855	09/10/13 00:10		TAL PHX
Total/NA	Prep	8015B			14995	09/11/13 08:42	RLB	TAL PHX
Total/NA	Analysis	8015 AZ R1		1	15120	09/13/13 07:03	ALC	TAL PHX
Total/NA	Prep	3550B			105587	09/09/13 13:55	LP	TAL NSH
Total/NA	Analysis	8310		1	106059	09/11/13 02:55	HMT	TAL NSH
Total/NA	Prep	7471A			14753	09/09/13 08:37	AJC	TAL PHX
Total/NA	Analysis	7471A		1	14829	09/09/13 13:26	AJC	TAL PHX
Total/NA	Prep	3050B			14937	09/10/13 15:37	JRC	TAL PHX
Total/NA	Analysis	6010B		1	15231	09/12/13 15:09	CCT	TAL PHX
Total/NA	Analysis	9095B		1	15178	09/12/13 15:45	TAS	TAL PHX

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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Certification Summary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Laboratory: TestAmerica Phoenix

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
AIHA	IHLAP		154268	07-01-15
Arizona	State Program	9	AZ0728	06-09-14
California	NELAP	9	01109CA	11-30-13
Nevada	State Program	9	AZ01030	07-31-14
New York	NELAP	2	11898	04-01-14
Oregon	NELAP	10	AZ100001	03-09-14
USDA	Federal		P330-09-00024	06-09-15

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	ISO/IEC 17025		0453.07	12-31-13
Alaska (UST)	State Program	10	UST-087	07-24-14
Arizona	State Program	9	AZ0473	05-05-14
Arizona	State Program	9	AZ0473	05-05-14 *
Arkansas DEQ	State Program	6	88-0737	04-25-14
California	NELAP	9	1168CA	10-31-13
Canadian Assoc Lab Accred (CALA)	Canada		3744	03-08-14
Connecticut	State Program	1	PH-0220	12-31-13
Florida	NELAP	4	E87358	06-30-14
Illinois	NELAP	5	200010	12-09-13
Iowa	State Program	7	131	05-01-14
Kansas	NELAP	7	E-10229	10-31-13
Kentucky (UST)	State Program	4	19	06-30-14
Louisiana	NELAP	6	30613	06-30-14
Maryland	State Program	3	316	03-31-14
Massachusetts	State Program	1	M-TN032	06-30-14
Minnesota	NELAP	5	047-999-345	12-31-13
Mississippi	State Program	4	N/A	06-30-14
Montana (UST)	State Program	8	NA	01-01-15
Nevada	State Program	9	TN00032	07-31-14
New Hampshire	NELAP	1	2963	10-10-13
New Jersey	NELAP	2	TN965	06-30-14
New York	NELAP	2	11342	04-01-14
North Carolina DENR	State Program	4	387	12-31-13
North Dakota	State Program	8	R-146	06-30-14
Ohio VAP	State Program	5	CL0033	01-19-14
Oklahoma	State Program	6	9412	08-31-14
Oregon	NELAP	10	TN200001	04-29-14
Pennsylvania	NELAP	3	68-00585	06-30-14
Rhode Island	State Program	1	LAO00268	12-30-13
South Carolina	State Program	4	84009 (001)	02-28-14
Tennessee	State Program	4	2008	02-23-14
Texas	NELAP	6	T104704077-09-TX	08-31-14
USDA	Federal		S-48469	11-02-13
Utah	NELAP	8	TN00032	07-31-14
Virginia	NELAP	3	460152	06-14-14
Washington	State Program	10	C789	07-19-14
West Virginia DEP	State Program	3	219	02-28-14

* Expired certification is currently pending renewal and is considered valid.

Laboratory: TestAmerica Nashville (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998020430	08-31-14
Wyoming (UST)	A2LA	8	453.07	12-31-13

Method Summary

Client: Hydro Geo Chem
Project/Site: 2010002.60.SPS

TestAmerica Job ID: 550-10102-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL PHX
8015 AZ R1	Arizona - Total Petroleum Hydrocarbons (GC)	SW846	TAL PHX
8310	PAHs (HPLC)	SW846	TAL NSH
6010B	Metals (ICP)	SW846	TAL PHX
7471A	Mercury (CVAA)	SW846	TAL PHX
9095B	Paint Filter	SW846	TAL PHX

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177
TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

550-10102

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-0013-550 (10/10)

CHAIN OF CUSTODY FORM

☒ Phoenix - 4625 E. Cotton Center Blvd., Suite 189, Phoenix, AZ 85040 (602) 437-3340 FAX (602)
☐ Tucson - 1870 W. Prince Road, Suite 59, Tucson, AZ 85705 (520) 807-3801 FAX (520) 807-3803
☐ Las Vegas - 6000 S Eastern Ave., Suite 5E, Las Vegas, NV 89119 (702) 429-1264

550-10102 Chain of Custody

Client Name/Address:
Hydro Geo Chem, Inc.,
6340 E. Thomas Rd, #228
Scottsdale, AZ 85251

Project/PO Number: 2010002.60.SPS

Project Manager: Steve Sutherland

Phone Number: 602-290-4774

Sampler: S. Sutherland

Fax Number: storus@HgCInc.com

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Analysis Req. 8015AZ,R01	VOCs (8260)	PAHs (8310)	8 RCRA Metals	Paint Filter					Special Instructions
ISW	Soil	stainless sleeve	1	9/5/13	1430	Ice	X	X	X	X	X					

Relinquished By: Date/Time: 9/5/13 1922 hrs
Received By: Date/Time: 9/5/13 / 19:22

Relinquished By: Date/Time: 9/6/13 [illegible]
Received By: Date/Time:

Relinquished By: Date/Time:
Received in Lab By: Sharon Malone Date/Time: 9/6/13 1332

Turnaround Time: (Check)
same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ normal X

Sample Integrity: (Check)
intact X on ice X

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

2.1°C

Login Sample Receipt Checklist

Client: Hydro Geo Chem

Job Number: 550-10102-1

Login Number: 10102

List Source: TestAmerica Phoenix

List Number: 1

Creator: DeShazo, Brittany N

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	Check done at department level as required.

Login Sample Receipt Checklist

Client: Hydro Geo Chem

Job Number: 550-10102-1

Login Number: 10102
List Number: 1
Creator: Huckaba, Jimmy

List Source: TestAmerica Nashville
List Creation: 09/07/13 11:20 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

SPECIAL WASTE PROFILE

Requested Disposal Facility: 4752 Apache Junction LF AZ	Waste Profile #
	Sales Rep #:

Saveable fill-in form. Restricted printing until all required (yellow) fields are completed.

I. Generator Information

Generator Name: Arizona Department of Environmental Quality			
Generator Site Address: Cooper Road and Commerce Avenue			
City: Gilbert	County: Maricopa	State: Arizona	Zip: 85233
State ID/Reg No:	State Approval/Waste Code: (if applicable)		NAICS # :
Generator Mailing Address (if different): ☑ 1110 W. Washington Street			
City: Phoenix	County: Maricopa	State: Arizona	Zip: 85007
Generator Contact Name: Scott Goodwin		Email: goodwin.scott@azdeq.gov	
Phone Number: (602) 771-4452	Ext:	Fax Number: (602) 771-4138	

IIa. Transporter Information

Transporter Name: Environmental Response, Inc.		Contact Name: Eric Smith	
Transporter Address: 2202 W. Medtronic Way, Suite 108			
City: Tempe	County: Maricopa	State: Arizona	Zip: 85281
Phone: (480) 967-2802	Fax: (480) 967-2735	State Transportation Number: AZ0000303032	

IIb. Billing Information

Bill To: Environmental Response, Inc.		Contact Name: Eric Smith	
Billing Address: 2202 W. Medtronic Way, Suite 108		Email: esmith@spray-eri.com	
City: Tempe	State: Arizona	Zip: 85281	Phone: (480) 967-2802

III. Waste Stream Information

Name of Waste: Soil Boring Cuttings (for monitoring well installation)

Process Generating Waste:

Investigative derived waste from soil borings for the installation of groundwater monitoring wells. No trichloroethylene or tetrachloroethylene was discovered.

Type of Waste:	☐ INDUSTRIAL PROCESS WASTE ☑ POLLUTION CONTROL WASTE
Physical State:	☑ SOLID ☐ SEMI-SOLID ☐ POWDER ☐ LIQUID
Method of Shipment:	☑ BULK ☐ DRUM ☐ BAGGED ☐ OTHER:
Estimated Annual Volume:	50 Tons
Frequency:	☑ ONE TIME ☐ ANNUAL
Disposal Consideration:	☑ LANDFILL ☐ SOLIDIFICATION ☐ BIOREMEDIATION

IV. Representative Sample Certification

☐ NO SAMPLE TAKEN

Is the representative sample collected to prepare this profile and laboratory analysis, collected in accordance with U.S. EPA 40 CFR 261.20(c) guidelines or equivalent rules?	☑ YES or ☐ NO
Sample Date: 9/5/13	Type of Sample: ☑ COMPOSITE SAMPLE ☐ GRAB SAMPLE
Sample ID Numbers: 555-10102-1	

Waste Profile #

V. Physical Characteristics of Waste

Characteristic Components	% by Weight (range)
1. Soil	100
2.	
3.	
4.	
5.	

Color	Odor (describe)	Does Waste Contain Free Liquids?	% Solids	pH:	Flash Point
Brown	None	☐ YES or ☑ NO	100	6-8	>140 °F

Attach Laboratory Analytical Report (and/or Material Safety Data Sheet) Including Chain of Custody and Required Parameters Provided for this Profile

Does this waste or generating process contain regulated concentrations of the following Pesticides and/or Herbicides: Chlordane, Endrin, Heptachlor (and it epoxides), Lindane, Methoxychlor, Toxaphene, 2,4-D, or 2,4,5-TP Silvex as defined in 40 CFR 261.33?	☐ Yes or ☑ No
Does this waste contain reactive sulfides (greater than 500 ppm) or reactive cyanide (greater than 250 ppm)[reference 40 CFR 261.23(a)(5)]?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of Polychlorinated Biphenyls (PCBs) as defined in 40 CFR Part 761?	☐ Yes or ☑ No
Does this waste contain concentrations of listed hazardous wastes defined in 40 CFR 261.31, 261.32, 261.33, including RCRA F-Listed Solvents?	☐ Yes or ☑ No
Does this waste exhibit a Hazardous Characteristic as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCCD), or any other dioxin as defined in 40 CFR 261.31?	☐ Yes or ☑ No
Is this a regulated Radioactive Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this a regulated Medical or Infectious Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this waste a reactive or heat generating waste?	☐ Yes or ☑ No
Does the waste contain sulfur or sulfur by-products?	☐ Yes or ☑ No
Is this waste generated at a Federal Superfund Clean Up Site?	☐ Yes or ☑ No
Is this waste from a TSD facility, TSD like facility or consolidator?	☐ Yes or ☑ No

VI. Certification

I hereby certify that to the best of my knowledge and belief, the information contained herein is a true, complete and accurate description of the waste material being offered for disposal and all known or suspected hazards have been disclosed. All Analytical Results/Material Safety Data Sheets submitted are truthful and complete and are representative of the waste.

I further certify that by utilizing this profile, neither myself nor any other employee of the company will deliver for disposal or attempt to deliver for disposal any waste which is classified as toxic waste, hazardous waste or infectious waste, or any other waste material this facility is prohibited from accepting by law. I shall immediately give written notice of any change or condition pertaining to the waste not provided herein. Our company hereby agrees to fully indemnify this disposal facility against any damages resulting from this certification being inaccurate or untrue.

I further certify that the company has not altered the form or content of this profile sheet as provided by Republic Services Inc.

Scott Goodwin, Project Manager
Authorized Representative Name And Title (Type or Print)

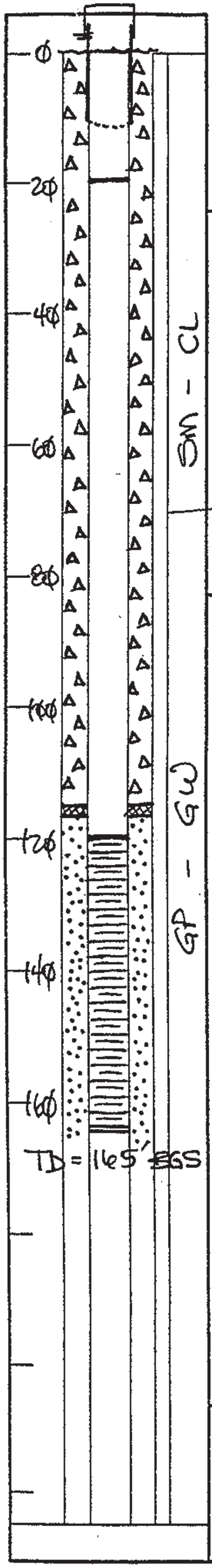
Arizona Department of Environmental Quality
Company Name

Authorized Representative Signature

Date

APPENDIX D

LITHOLOGIC LOGS AND WELL CONSTRUCTION DIAGRAMS FOR MONITORING WELLS



Well MW 101
Boring No. X-Ref: N/A

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: N/A
Elevation Ground Level 1225.62' MSL
Top of Casing 1227.63' MSL

Drilling Summary:

Total Depth 165'
Borehole Diameter 10"
Casing Stick-up Height: 2'
Driller CHRISTENSEN BOYLES CORPORATION
Rig SCHRAMM- ODEX
Bit(s) N/A
Drilling Fluid AIR
Protective Casing N/A

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging:				
Casing:				
Filter Placement:				
Cementing:				
Development:				

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____
Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
0 - 20	C1	-
20 - 120	C2	-
120 - 165	S1	-
-		-
-		-

Casing: C1 4" STEEL
C2 4" PVC; FJ
Screen: S1 4"; FACTORY- SLOTTED; 0.020"
S2
Filter Pack: SILICA SAND; 8-12 COLORADO SILICA
Grout Seal: PORTLAND ANNULAR SEAL; 118' to 0'
Bentonite Seal: PELLETS; 120' to 118'

Well Development: 10/5/94

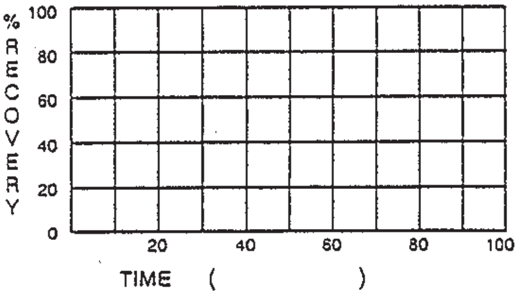
DEVELOPED BY PUMP (GRUNDFOS); APPROX. 3, 55-GALLON DRUMS WERE FILLED TO ACHIEVE RELATIVELY CLEAR WATER; SAMPLED 1 WEEK LATER.

Stabilization Test Data: N/A

Time	pH	Spec. Cond.	Temp (C)

Recovery Data: N/A

Q=
S_o=

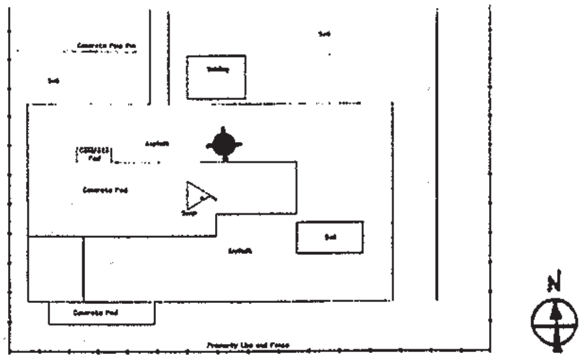


Comments: BOREHOLE DRILLED BY ODEX TO APPROX. 70' BGS; RETRACTED CASING TO REAM; BOREHOLE COMPLETED TO 165' TOTAL DEPTH WITH ODEX

SITE NAME Unichem Site
LOCATION Gilbert, Arizona
SUPERVISED BY
DATE

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033	CLIENT Simon - NM	LOCATION Gilbert	
DRILLING METHOD: Schram ODEX Rotary Drive			BORING NO. 101 MW
			SHEET 1 OF 4
SAMPLING METHOD: Drive spoon with 3, 6-inch sleeves			DRILLING

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

START	FINISH
TIME	TIME
DATE	DATE

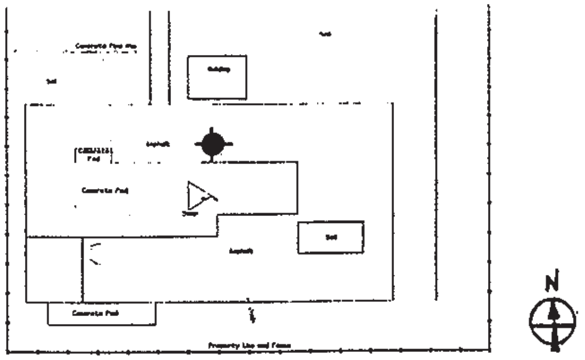
DRILLING CONTR. Boyles Bros.

BY ______ DATE ______ CHK'D BY ______

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	OVM	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
							SM	Silty Sand - Sandy Silt; with some clay; Dry semi-cohesive; moderate to low density
								Clay to silty clay; with some sand; Red-brown to brown; cohesive; little caliche pebbles; very dense
				13/28/37	11			
						10	CL	
				16/33/35	13			
				10/23/50	16	20		
								Sandy silt; with some clay; Buff color; non cohesive; some caliche pebbles; low to moderate density
				36/28(4)	9			
							SM	
				78(6)	2			
						30		
								Silty clay to clay with silt; Dark red-brown cohesive; very dense
				15/50	13		CL	
								Sandy silt to silty sand; Red-brown with caliche pebbles; non cohesive
						40	SM	

HYDRO-SEARCH INC.

LOCATION OF BORING



JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. 101 MW

SHEET 2 OF 4

DRILLING METHOD:

SAMPLING METHOD:

DRILLING	
START TIME	FINISH TIME
DATE	DATE

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DATUM

ELEVATION

SURFACE CONDITIONS:

DRILLING CONTR. Boyles Bros.

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	OVM	DEPTH IN FEET	SOIL GRAPH	
				20/38/20	3		CL	CLAY TO SILTY CLAY; ABUNDANT CALICHE PEBBLES; SEMI-COHESIVE TO COHESIVE; DENSE; MOIST; RED-BROWN TO BROWN
						50		
				10/10/20	5		CH	CLAY; BUFF; VERY COHESIVE; VERY DENSE; HIGH PLASTICITY
						60	ML	CLAYEY SILT TO SANDY SILT; RED-BROWN; MOIST; COHESIVE; MODERATELY DENSE
				15/6	2			
						70		
				15/15/25	1		SP	SAND; POORLY GRADED; WITH FEW COBBLES; ROUNDED TO SUBROUNDED GRAINS
							GP	GRAVEL WITH SAND TO SANDY GRAVEL; SOME CONGLOMERATE CLASTS
						80		VARIABLE AMOUNTS OF SILT AND CLAY
								COBBLES AND RIVER LAG DEPOSITS

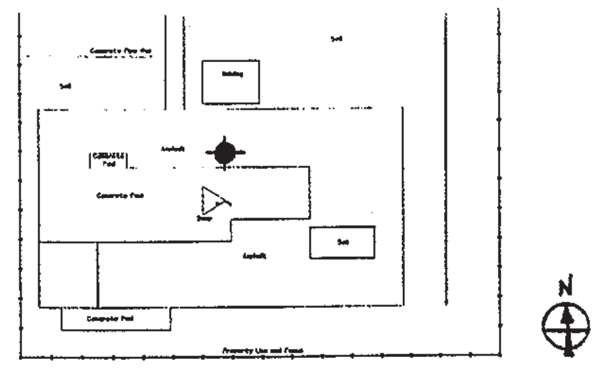
BY

DATE

CHK'D BY

HYDRO-SEARCH INC.

LOCATION OF BORING	JOB NO. 806568033	CLIENT Simon - NM	LOCATION Gilbert



DRILLING METHOD:

SAMPLING METHOD:

BORING NO. 101 MW

SHEET 3 OF 4

DRILLING	
START TIME	FINISH TIME
DATE	DATE

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DATUM

ELEVATION

DRILLING CONTR. Boyles Bros.

BY

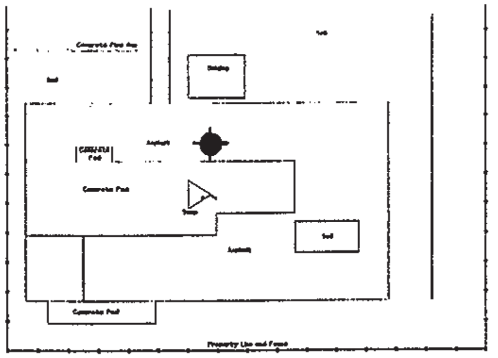
DATE

CHK'D BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
				N/A	N/A			
						90		
								Gravel- and Cobble- supported; with coarse-
				N/A	N/A			grained sand, no fines; no sample recovered
							GW	
						100		
				N/A	N/A			Cobble and Gravel; some sand and silt (clast supported); no sample recovered
						110		
				26/50(1)	N/A			Gravel with cobbles and sand; some silt and clay [Sample collected into 4 oz jar; with rock fragments]
							GP	
						120		
							GW	Sandy Gravel to Gravelly Sand; rounded to
				6/40/76	0.3			subrounded clasts; moist
								Some cobbles

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. 101 MW

SHEET 4 OF 4

DRILLING METHOD:

SAMPLING METHOD:

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING

START	FINISH
TIME	TIME
DATE	DATE

SURFACE CONDITIONS:

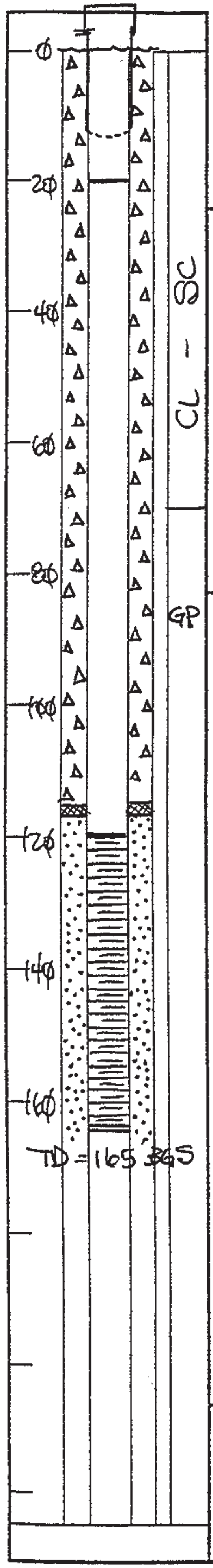
DRILLING CONTR. Boyles Bros.

BY

DATE

CHK'D BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							GP	
						130		SANDY GRAVEL WITH SOME CLAY; DENSE
							▼	SATURATED ZONE; SAMPLE WAS WET
				100(6)	0.0			
						140		COMMENT: VENT SLURRY INDICATES ABUNDANT COBBLES AND GRAVEL WITH SOME SAND, SILT, AND MINOR CLAY.
								SEDIMENT VARYS BETWEEN SAND- AND CLAST SUPPORTED.
						150		
						160		
							TD 165'	



Well [illegible]. MW102

Boring No. X-Ref: N/A

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: N/A

Elevation Ground Level 1225.47 MSL

Top of Casing 1227.47 MSL

Drilling Summary:

Total Depth 165'

Borehole Diameter 10"

Casing Stick-up Height: 2'

Driller CHRISTENSEN BOYLES CORPORATION

Rig SCHRAMM- ODEX

Bit(s) N/A

Drilling Fluid AIR

Protective Casing N/A

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging:				
Casing:				
Filter Placement:				
Cementing:				
Development:				

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ___

Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
0 - 20	C1	-
20 - 120	C2	-
120 - 165	S1	-
-		-
-		-

Casing: C1 4" STEEL

C2 4" PVC; FJ

Screen: S1 4"; FACTORY- SLOTTED; 0.020"

S2

Filter Pack: SILICA SAND; 8-12 COLORADO SILICA

Grout Seal: PORTLAND ANNULAR SEAL; 118' to 0'

Bentonite Seal: PELLETS; 120' to 118'

Well Development: 10/5/94

DEVELOPED BY PUMP (GRUNDFOS); APPROX. 3, 55-GALLON DRUMS WERE FILLED TO ACHIEVE RELATIVELY CLEAR WATER; SAMPLED 1 WEEK LATER.

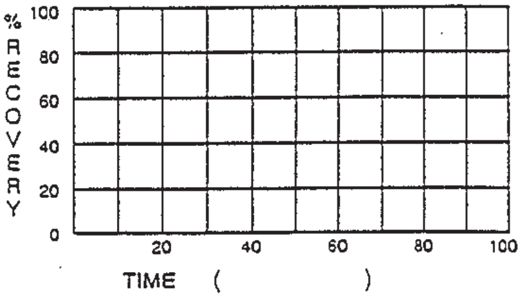
Stabilization Test Data: N/A

Time	pH	Spec. Cond.	Temp (C)

Recovery Data: N/A

Q=

S_0 =



Comments: FINE-GRAINED SOILS DRILLED BY AUGER, REAMED WITH ODEX, AND COBBLE-GRAVEL DRILLED BY ODEX TO TOTAL DEPTH.

SITE NAME UNICHEM SITE

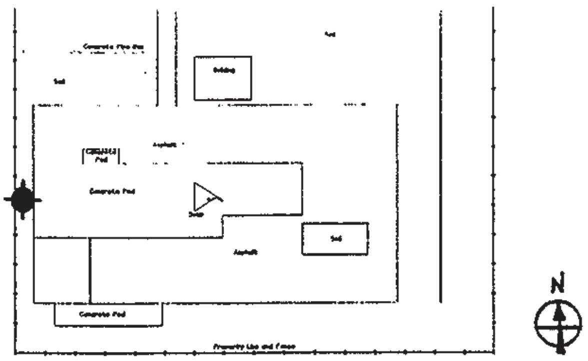
LOCATION GILBERT, ARIZONA

SUPERVISED BY Steve [illegible]

DATE

HYDRO-SEARCH INC.

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
	806568033	Simon - NM	Gilbert



DATUM

ELEVATION

DRILLING METHOD:

SAMPLING METHOD:

BORING NO. 102 MW

SHEET 1 OF 4

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START TIME	FINISH TIME
DATE	DATE

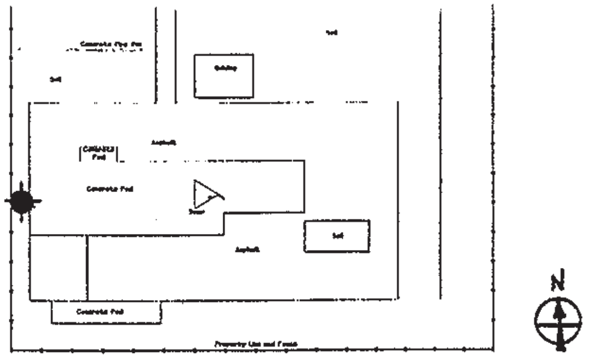
DRILLING CONTR. Boyles Bros.

BY ___ DATE ___ CHK'D BY ___

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS		DEPTH IN FEET	SOIL GRAPH	
							GC	Silty clay with Gravel (0.5" to 1"); Light Brown
				5/7/9	0.0			Silty clay with some sand; little Gravel; Brown; Some moisture
							ML	
				8/12/13	0.6	10		
				11/17/21	2.8			
							CL	
				18/19/24	0.9	20		Clay; Dense, very cohesive; Red-Brown; Some pockets of caliche pebbles
								Clayey silt to silty clay; very dense with some cemented zones
							SC	
				21/26	1.6	30		Silty clay with silty sand lenses; little fine gravels
				28/51	19.8	40		

LOCATION OF BORING



DATUM

ELEVATION

JOB NO.	CLIENT	LOCATION
806568033	SIMON - NM	GILBERT

BORING NO. MW102

SHEET 2 OF 4

DRILLING METHOD:

SAMPLING METHOD:

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START TIME	FINISH TIME
DATE	DATE

DRILLING CONTR. Boyles Bros.

BY BS

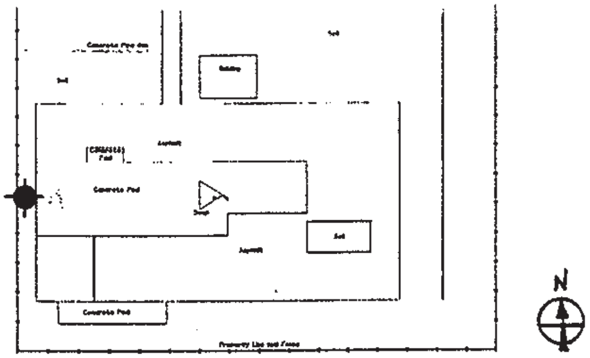
DATE

CHK'D BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS		DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						50	CL	CLAY; RED-BROWN; PLASTIC, LOW DENSITY
				12/17/19	11.6			
							SC	SILTY CLAY TO SANDY CLAY; DENSE
						60		SANDY SILT TO SILTY SAND; SOME CALICHE AND CALICHE PEBBLES; FEW CEMENTED LENSES
				29/43	4.3			
							SM	
							ML	SILTY CLAY; FEW CEMENTED LENSES
				21/48	16.2	70		
								COBBLES; HEAVY GRAVEL [AUGER REFUSAL]
							GW	
						80		
								LARGE COBBLES WITH COARSE-GRAINED GRAVEL; LITTLE OR NO SAND MATRIX; NO SAMPLE RECOVERY

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. MW102

SHEET 3 OF 4

DRILLING METHOD:

SAMPLING METHOD:

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START	FINISH
TIME	TIME
DATE	DATE

DRILLING CONTR. Boyles Bros.

BY

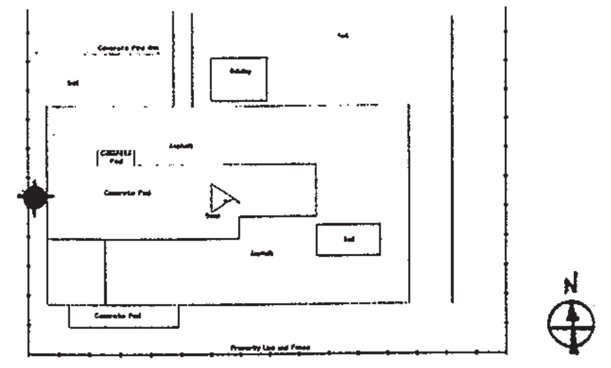
DATE

CHK'D BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	OVM	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						90		
								GRAVEL WITH LITTLE TO NO SAND; SOME COBBLES
								NO SAMPLE RECOVERY
						100	GP	
								GRAVEL AND COBBLE; WITH SOME SAND
				50(5)				SAMPLER WITH MINOR RECOVERY OF ROCK FLOUR, SAND, AND FRAGMENTS
						110		
							SP	
				30/30/30	0.0			SAND WITH LITTLE TO NO GRAVEL; MOIST
								(SAND IS WELL-ROUNDED, SORTED, POORLY GRADED)
							GP	COBBLES WITH GRAVEL
						120	SP	SAND; POORLY GRADED
								GRAVEL AND COBBLE-SUPPORTED SAND
							GP	LITTLE TO NO SAMPLE RECOVERY

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 8065680033

CLIENT Simon - NM

LOCATION GILBERT

BORING NO. MW102

SHEET 4 OF 4

DRILLING METHOD:

SAMPLING METHOD:

DRILLING: START TIME / FINISH TIME; DATE / DATE

WATER LEVEL

TIME

DATE

CASING DEPTH

SURFACE CONDITIONS:

DRILLING CONTR. Boyles Bros.

BY ____ DATE ____ CHK'D BY ____

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS		DEPTH IN FEET	SOIL GRAPH	
							GP	
						130		GRAVEL WITH SOME SAND
								PARTIAL RECOVERY ONLY; SATURATED SAMPLE
						140		COMMENT: COBBLES AND GRAVELS WITH SAND-RICH LAYERS AND LENSES; SOME FINES PRODUCE A MUD SLURRY OF CUTTINGS
								UNIT CONTINUES ESSENTIALLY UNCHANGED TO TOTAL DEPTH.
						150		
						160		
							TD 165'	

Well No. MW 103

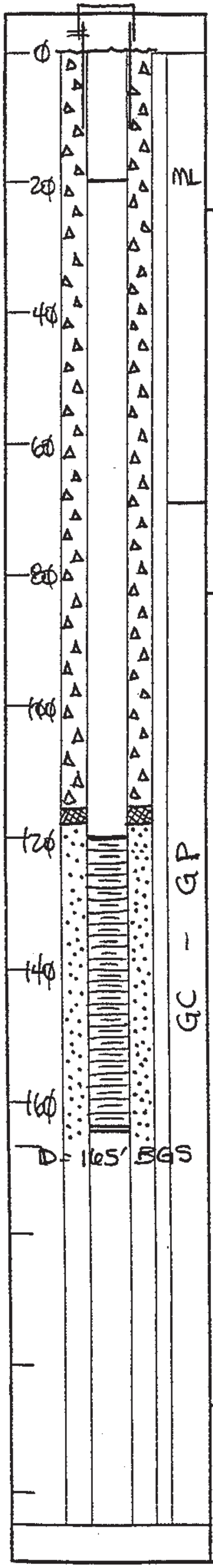
Boring No. X-Ref: N/A

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: N/A

Elevation Ground Level 1225.27 MSL

Top of Casing 1226.43 MSL



Drilling Summary:

Total Depth 165'

Borehole Diameter 10"

Casing Stick-up Height: 2'

Driller CHRISTENSEN BOYLES CORPORATION

Rig SCHRAMM- ODEX

Bit(s) N/A

Drilling Fluid AIR

Protective Casing N/A

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging:				
Casing:				
Filter Placement:				
Cementing:				
Development:				

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
0 - 20	C1	-
20 - 120	C2	-
120 - 165	S1	-
-		-
-		-

Casing: C1 4" STEEL

C2 4" PVC; FJ

Screen: S1 4"; FACTORY- SLOTTED; 0.020"

S2

Filter Pack: SILICA SAND; 8-12 COLORADO SILICA

Grout Seal: PORTLAND ANNULAR SEAL; 118' to 0'

Bentonite Seal: PELLETS; 120' to 118'

Well Development: 10/5/94

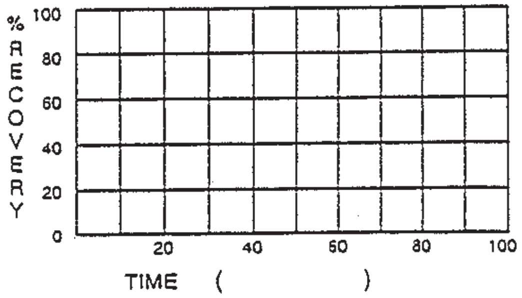
DEVELOPED BY PUMP (GRUNDFOS); APPROX. 3, 55-GALLON DRUMS WERE FILLED TO ACHIEVE RELATIVELY CLEAR WATER; SAMPLED 1 WEEK LATER.

Stabilization Test Data: N/A

Time	pH	Spec. Cond.	Temp (C)

Recovery Data: N/A

Q= S₀=



Comments: FINE - GRAINED SOILS DRILLED BY AUGER, REAMED WITH ODEX, AND GRAVEL- COBBLES DRILLED BY ODEX

SITE NAME UNICHEM SITE

LOCATION GILBERT, ARIZONA

SUPERVISED BY

DATE

HYDRO-SEARCH INC.

DRILLING CONTR. Boyles Bros.

BY ______ DATE ______ CHK'D BY ______

JOB NO.	CLIENT	LOCATION
8065680 33	Simon - NM	Gilbert

BORING NO. MW103

SHEET 1 OF 4

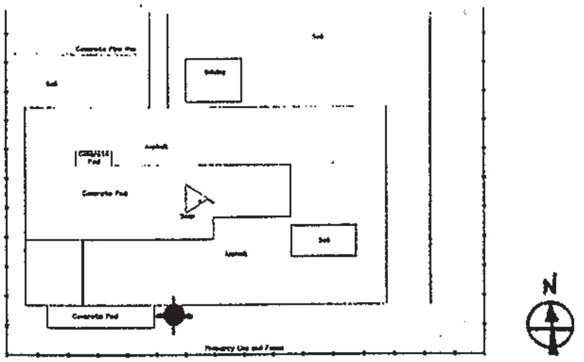
DRILLING METHOD:

SAMPLING METHOD:

DRILLING	START	FINISH
TIME		
DATE		

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

LOCATION OF BORING



DATUM

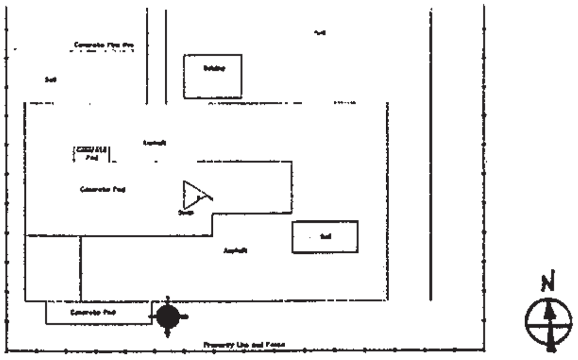
ELEVATION

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							ML	Silty clay with some (little) gravel; low density
				8/8/11	15.1	10		Clayey silt with minor cementation; some dense zones
				17/19/26	12.9	20		Silty clay to sandy clay; cemented zones; low to medium density
							ML	
				29/57	1.6	30		
				29/63	0.0	40		Clay with silty sand lenses (cemented); moist

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. MW103

SHEET 2 OF 4

DRILLING METHOD:

SAMPLING METHOD:

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING

START	FINISH
TIME	TIME
DATE	DATE

SURFACE CONDITIONS:

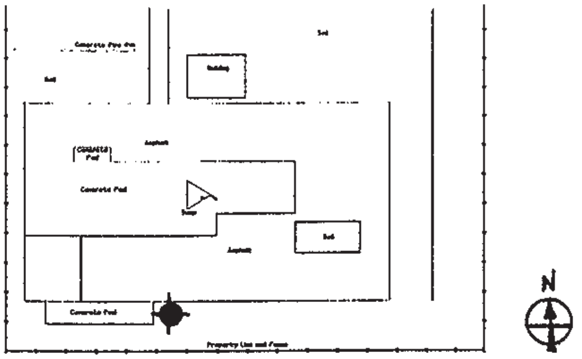
DRILLING CONTR. Boyles Bros.

BY ______ DATE ______ CHK'D BY ______

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							ML	
				21/28/40	0.0	50		CLAY TO SILTY CLAY; CALICHE NODULES AND PEBBLES
								CLAY SILT TO SILTY CLAY; VERY DENSE; SOME CEMENT
				31/50(3)	0.3	60		
					1.6			
							ML	
						70		
				10/10/32	0.9			CLAYEY SILT; SEMI-COHESIVE; MODERATE DENSE; SOME SAND
								INCREASED SAND WITH GRAVEL AND COBBLES
							GP	
						80		
								GRAVEL-SUPPORTED SAND; SUBROUNDED TO ROUNDED [NO SAMPLE RECOVERED]

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033	CLIENT Simon - NM	LOCATION Gilbert
DRILLING METHOD:		BORING NO. MW103
SAMPLING METHOD:		SHEET 3 OF 4

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING	
START	FINISH
TIME	TIME
DATE	DATE

DRILLING CONTR. Boyles Bros.

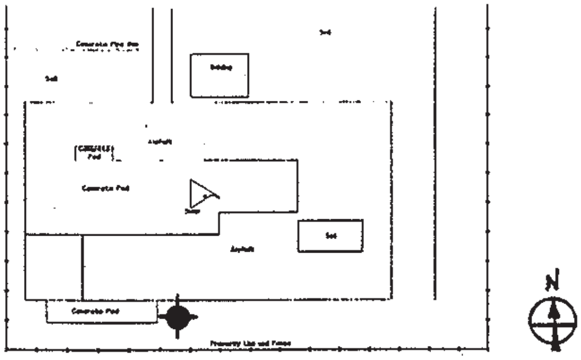
BY ______ DATE ______ CHK'D BY ______

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							GP	
						90		
				25/45/55	0.9			GRAVELLY SAND TO SANDY GRAVEL [POOR SAMPLE RECOVERY]
						100	GW	
								GRAVEL - COBBLE SUPPORTED SAND; SOME MINOR SILT AND CLAY
						110		
				45/50(3)				
							GC	
						120		
								SANDY GRAVEL TO GRAVELLY SAND; WITH CLAY AND SILT; MOIST
				16/50	0.9			

HYDRO-SEARCH INC.

LOCATION OF BORING



DATUM

ELEVATION

JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. MW103

SHEET 4 of 4

DRILLING METHOD:

SAMPLING METHOD:

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING

START	FINISH
TIME	TIME
DATE	DATE

SURFACE CONDITIONS:

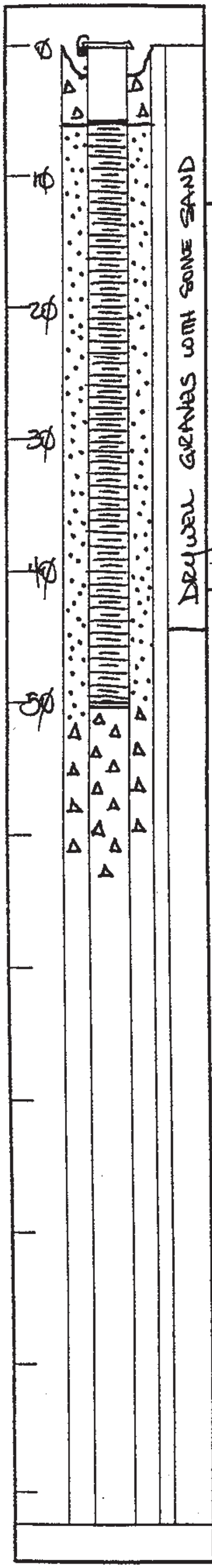
DRILLING CONTR. Boyles Bros.

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							GC	
						130		
				30/50 (1.5)			▼	SILTY SAND WITH GRAVEL; SOME CLAY-RICH MUD
								WATER SATURATED SAMPLE
								COMMENT: COBBLES AND GRAVELS WITH VARYING AMOUNTS OF SAND, SILT, AND CLAY.
						140		
								MUDDY DISCHARGE INDICATES PRESENCE OF FINES.
						150		
						160		
							TD 165'	

BY BS

DATE

CHK'D BY



Well No. VW 104

Boring No. X-Ref: N/A

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: N/A

Elevation Ground Level N/A

Top of Casing N/A

Drilling Summary:

Total Depth 50'

Borehole Diameter 10"

Casing Stick-up Height: 0' (2' ABOVE DRYWELL)

Driller CHRISTENSEN BOYLES CORPORATION

Rig SCHRAMM - ODEX

Bit(s) N/A

Drilling Fluid AIR

Protective Casing N/A

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys. Logging:				
Casing:				
Filter Placement:				
Cementing:				
Development:				

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
0' - 5'	C1	-
5' - 50'	S1	-
-		-
-		-
-		-

Casing: C1 4" PVC; FJ

C2

Screen: S1 4" PVC; FJ; 0.040" FACTORY SLOT

S2

Filter Pack: SILICA SAND; 6-8 COLORADO SILICA

Grout Seal:

Bentonite Seal:

Well Development:

N/A

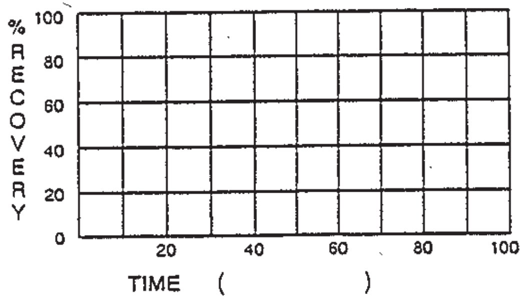
Stabilization Test Data: N/A

Time	p H	Spec. Cond.	Temp (C)

Recovery Data: N/A

Q=

S_o=



Comments: WELL INSTALLED WITHIN SUMP AREA WITHIN THE DRYWELL PROPER. BORE HOLE EXTENDED TO 99.9' BGS (SEE DRILLER'S LOG)); BOREHOLE WAS GROUTED TO APPROX. 50' BGS.

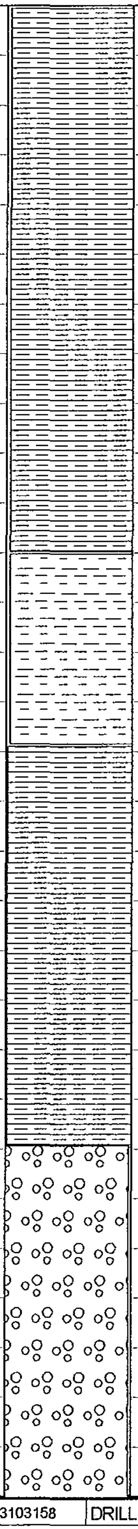
SITE NAME UNICHEM SITE

LOCATION GILBERT, ARIZONA

SUPERVISED BY

DATE

Page 1 of 10



DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
5				
				06/17/03
10		CL	BROWN SANDY CLAY	10:30
15				
20		CL	BROWN SANDY CLAY	13:20
25				
30		SC	BROWN CLAYEY SAND	13:42
35				
40		CL	BROWN SANDY CLAY	13:54
45				
50		CL	BROWN CLAY	14:02
55				
60		GW	SANDY GRAVEL WELL GRADED	14:47
65				
70		GW	SANDY GRAVEL, WELL GRADED	15:07
75				

PROJ.#: 03103158	DRILL DATE: 06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD:MUD ROTARY	

BE&K/TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
80		SW	GRAVELLY SAND, WELL GRADED	06/18/03 10:20
85				
90		SW	GRAVELLY SAND, WELL GRADED	13:30
95				
100		SW	GRAVELLY SAND, WELL GRADED	16:00
105				
				06/19/03
110		GW	SANDY GRAVEL, WELL GRADED	15:10
115				
120		SW	GRAVELLY SAND, WELL GRADED	15:30
125				
				06/20/03
130		GP	WELL SORTED GRAVEL	13:40
135				
140		SW	GRAVELLY SAND, WELL GRADED	14:40
145				
150		GW	COARSE SANDY GRAVEL, WELL GRADED	15:00

PROJ.#:03103158	DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY	

FIELD BOREHOLE LOG

MW-104D

COOPER RD/COMMERCE AVE WQARF

GILBERT, ARIZONA

Page 3 of 10

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
155				
		GW	COARSE SANDY GRAVEL, WELL GRADED	16:00
160				
165				
				06/21/03
		GW	COARSE SANDY GRAVEL, WELL GRADED	10:20
170				
175				
		SW	COARSE GRAVELLY SAND, WELL GRADED	10:50
180				
185				
		GW	SANDY GRAVEL, WELL GRADED	12:00
190				
195				
		GP	WELL SORTED GRAVEL/COBBLES	12:25
200				
205				
				06/22/03
		GW	SANDY GRAVEL, WELL GRADED	11:35
210				
215				
		GW	SANDY GRAVEL, WELL GRADED	12:00
220				
225				

PROJ.#:03103158	DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY	

BE&K/TerraNext

FIELD BOREHOLE LOG

MW-104D

COOPER RD/COMMERCE AVE WQARF

GILBERT, ARIZONA

F:\WP FILE\PROJECTS\03103158\BOREHOLE LOGS. CNV

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
230		GW	SANDY FINE GRAVEL, WELL GRADED	12:55
235				
240		SW	GRAVELLY MEDIUM TO COARSE SAND	16:00
245				
250		SW	GRAVELLY MEDIUM TO COARSE SAND	16:25
255				
				06/23/03
260		GP	GRAVEL, POORLY GRADED	09:45
265				
270		CL	GRAVELLY CLAY	10:15
275				
280		CL	GRAVELLY CLAY	10:30 STEEL CASING INSTALLED TO 280'
285				
				07/01/03
290		CL	GRAVELLY CLAY	15:45
295				
300		CL	GRAVELLY CLAY	16:00

PROJ.#:03103158	DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY	

BE&K/TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

Page 5 of 10

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
305				
				07/02/03
310		CL	GRAVELLY CLAY	07:40
315				
320		CL	GRAVELLY CLAY	08:10
325				
330		CL	GRAVELLY CLAY	08:30
335				
340		CL	GRAVELLY CLAY	09:05
345				
350		CL	GRAVELLY CLAY	09:20
355				
360		CL	GRAVELLY CLAY	09:45
365				
370		CL	GRAVELLY CLAY	10:00
375				

PROJ.#:03103158 DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER:132'
RIG TYPE: SCHRAMM DIAMETER: 9 7/8"
DRILLER: LAYNE TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY

BE&K/TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

F:\WP FILE\PROJECTS\03103158\BOREHOLE LOGS. CNV

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
380		CL	BROWN CLAY	10:30
385				
390		CL	BROWN CLAY	10:45
395				
400		CL	BROWN CLAY	11:00
405				
				07/07/03
410		CL	BROWN CLAY	07:40
415				
420		CL	BROWN CLAY	07:50
425				
430		CL	BROWN CLAY	08:20
435				
440		CL	BROWN CLAY	08:30
445				
450		CL	BROWN CLAY	08:50

PROJ.#:03103158 DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER:
RIG TYPE: SCHRAMM DIAMETER: 9 7/8"
DRILLER: LAYNE TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY

BE&K / TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

Page 7 of 10

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
455				
460		CL	BROWN CLAY, SOME GRAVEL	09:10
465				
470		CL	BROWN CLAY, SOME GRAVEL	09:26
475				
480		CL	BROWN CLAY, SOME GRAVEL	09:49
485				
490		CL	BROWN CLAY	10:10
495				
500		CL	BROWN CLAY	10:37
505				
510		CL	BROWN CLAY, SOME GRAVEL	11:03
515				
520		CL	BROWN SANDY CLAY	11:30
525				

PROJ.#:03103158	DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY	

BE&K/TerraNext

FIELD BOREHOLE LOG

MW-104D

COOPER RD/COMMERCE AVE WQARF

GILBERT, ARIZONA

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
530		CL	BROWN CLAY	11:58
535				
540		CL	BROWN SANDY CLAY	12:21
545				
550		CL	BROWN CLAY	12:45
555				
560		CL	BROWN CLAY	13:21
565				
570		CL	BROWN CLAY	13:50
575				
580		CL	BROWN CLAY	14:12
585				
590		CL	BROWN CLAY	14:30
595				
600		CL	BROWN COARSE SANDY CLAY	14:43

PROJ.#:03103158 DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER:
RIG TYPE: SCHRAMM DIAMETER: 9 7/8"
DRILLER: LAYNE TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY

BE&K/TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
605				
610		CL	BROWN COARSE SANDY CLAY	15:20
615				
620		CL	BROWN GRAVELLY CLAY	15:40
625				
630		CL	BROWN CLAY	16:15
635				
640		CL	BROWN CLAY	07/08/03 07:51
645				
650		CL	BROWN CLAY	08:26
655				
660		CL	BROWN CLAY	08:50
665				
670		CL	BROWN CLAY	09:08
675				

PROJ.#:03103158 DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER:132'
RIG TYPE: SCHRAMM DIAMETER: 9 7/8"
DRILLER: LAYNE TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

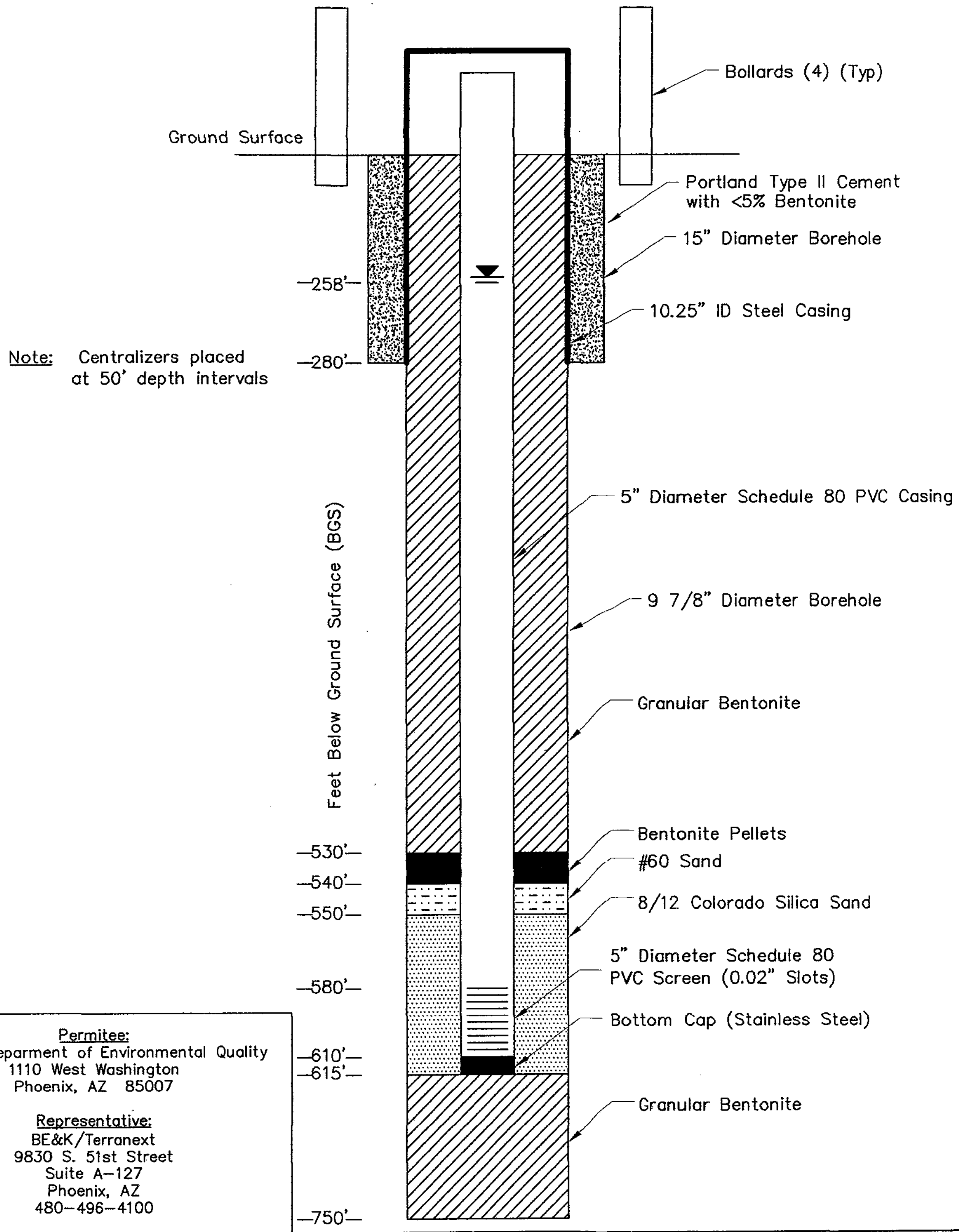
Page 10 of 10

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
680		CL	BROWN CLAY WITH MINOR GRAVEL	09:37
685				
690		CL	BROWN CLAY WITH MINOR GRAVEL	10:04
695				
700		CL	BROWN CLAY WITH MINOR GRAVEL	10:37
705				
710		CL	BROWN CLAY	11:05
715				
720		CL	BROWN CLAY	11:26
725				
730		CL	BROWN CLAY WITH MINOR GRAVEL	11:56
735				
740		CL	BROWN SANDY CLAY	12:18
745				
750		CL	BROWN CLAY WITH MINOR GRAVEL	13:06
				TD = 750'

PROJ.#:03103158	DRILL DATE:06/17/03
LOGGED BY: BE&K/TERRANEXT	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:	
RIG TYPE: SCHRAMM	DIAMETER: 9 7/8"
DRILLER: LAYNE	TOTAL DEPTH: 750'
DRILLING METHOD: MUD ROTARY	

BE&K/TerraNext

FIELD BOREHOLE LOG
MW-104D
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA



Permitee:
Arizona Deparment of Environmental Quality
1110 West Washington
Phoenix, AZ 85007

Representative:
BE&K/Terranext
9830 S. 51st Street
Suite A-127
Phoenix, AZ
480-496-4100

PROJ. #: 03103158
DATE: 8/1/03
DRAWN BY: MJK
SCALE: N.T.S.
DESIGNED BY: AJG
PAGE #:
APPROVED BY: AJG

BE&K/Terranext

FIGURE 3
DEEP MONITOR WELL DETAIL (MW-104D)
GILBERT, ARIZONA

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Page 1 of 3

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
5				
10		CL	BROWN SANDY CLAY	08:23
15				
20		CL	BROWN SANDY CLAY	08:37
25				
30		SC	BROWN, CLAYEY FINE SAND	09:10
35				
40		CL	BROWN CLAY	09:26
45				
50		CL	BROWN CLAY	09:50
55				
60		GW	SANDY GRAVEL WELL GRADED	11:15
65				
70		GW	SANDY GRAVEL WITH COBBLES, WELL GRADED	11:30
75				

PROJ.#: 03103158 DRILL DATE: 07/22/03
LOGGED BY: P. CHARMAN
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER: 132'
RIG TYPE: AP1000 DIAMETER: 12"
DRILLER: LAYNE TOTAL DEPTH: 170'
DRILLING METHOD: AIR/PERCUSSION HAMMER

FIELD BOREHOLE LOG
MW-104S
COOPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
80		SW	GRAVELLY SAND WITH SOME COBBLES, WELL GRADED	11:46
85				
90		GW	SANDY GRAVEL WITH COBBLES, WELL GRADED	12:05
95				
100		GW	SANDY GRAVEL WITH COBBLES, WELL GRADED	12:20
105				
110		SW	GRAVELLY SAND, WELL GRADED	13:20
115				
120		GW	SANDY GRAVEL, WELL GRADED	13:40
125				
130		CL	GRAVELLY CLAY	14:00
135				
140		GW	SANDY GRAVEL WITH COBBLES, WELL GRADED	14:15
145				
150		GP	COARSE GRAVEL W/ MINOR COARSE SAND, POORLY GRADED	14:24

PROJ.#:03103158	DRILL DATE:07/22/03
LOGGED BY: P. CHARMAN	
PROJECT MANAGER: A. GORDON	
NOTES:	
DEPTH TO WATER:132'	
RIG TYPE: AP1000	DIAMETER: 12"
DRILLER: LAYNE	TOTAL DEPTH: 170'
DRILLING METHOD: AIR/ PERCUSSION HAMMER	

BE&K/TerraNext

FIELD BOREHOLE LOG

MW-104S

COOPER RD/COMMERCE AVE WQARF

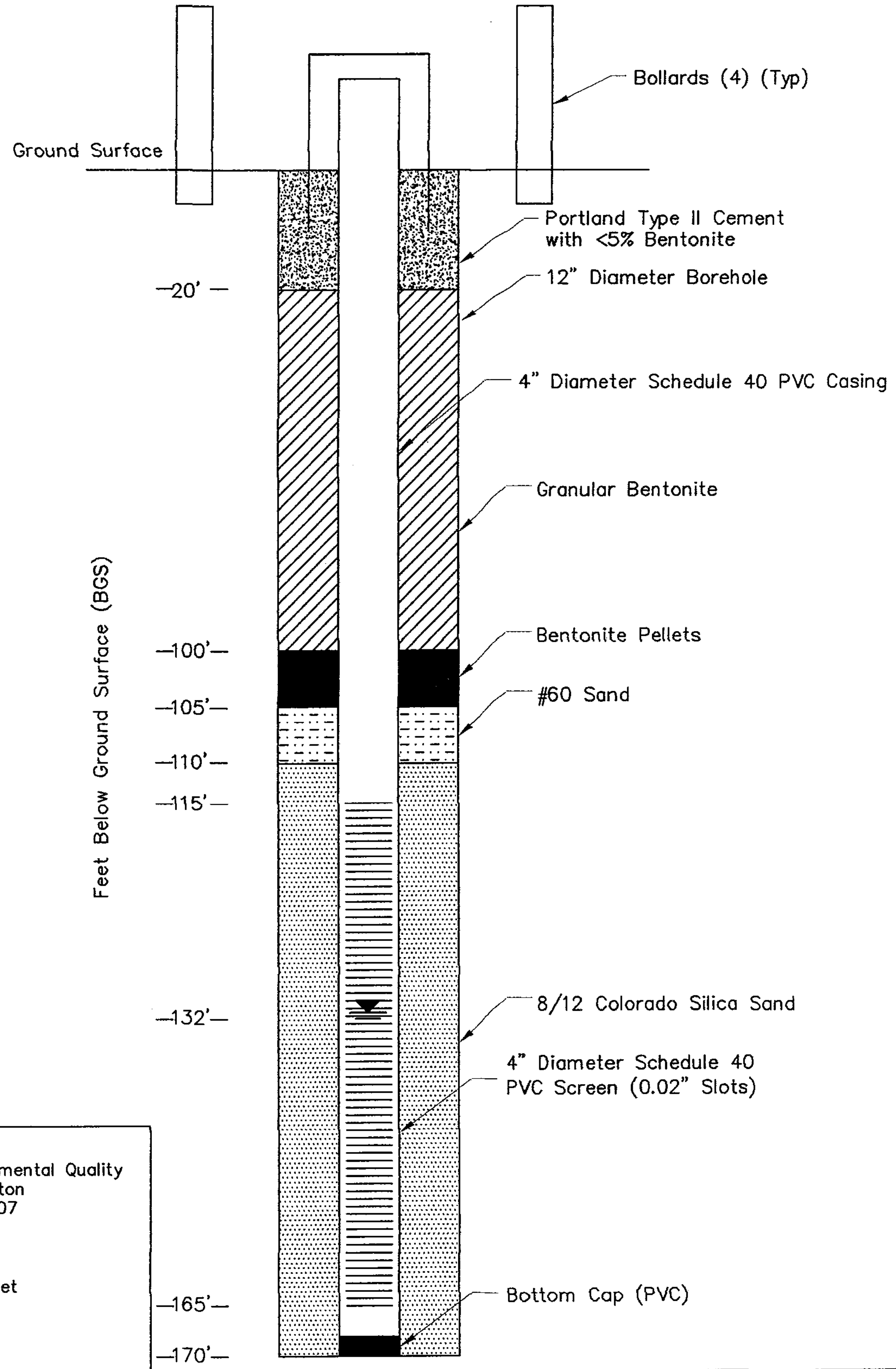
GILBERT, ARIZONA

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	COMMENTS
155				
160		GW	SANDY COARSE GRAVEL, WELL GRADED	
165				
170		GW	COARSE SANDY GRAVEL, WELL GRADED	TD = 170'
175				
180				
185				
190				
195				
200				
205				
210				
215				
220				
225				

PROJ.#: 03103158
DRILL DATE: 07/22/03
LOGGED BY: P. CHARMAN
PROJECT MANAGER: A. GORDON
NOTES:
DEPTH TO WATER: 132'
RIG TYPE: AP1000
DIAMETER: 12"
DRILLER: LAYNE
TOTAL DEPTH: 170'
DRILLING METHOD:AIR/PERCUSSION HAMMER

BE&K / TerraNext

FIELD BOREHOLE LOG
MW-104S
COPPER RD/COMMERCE AVE WQARF
GILBERT, ARIZONA



Permitee:
Arizona Deparment of Environmental Quality
1110 West Washington
Phoenix, AZ 85007

Representative:
BE&K/Terranext
9830 S. 51st Street
Suite A-127
Phoenix, AZ
480-496-4100

PROJ. #: 03103158	DATE: 8/1/03	BE&K/TerraNext
DRAWN BY: MJK	SCALE: N.T.S.	
DESIGNED BY: AJG	PAGE #:	
APPROVED BY: AJG		

FIGURE 4
SHALLOW MONITOR WELL DETAIL (MW-104S)
GILBERT, ARIZONA

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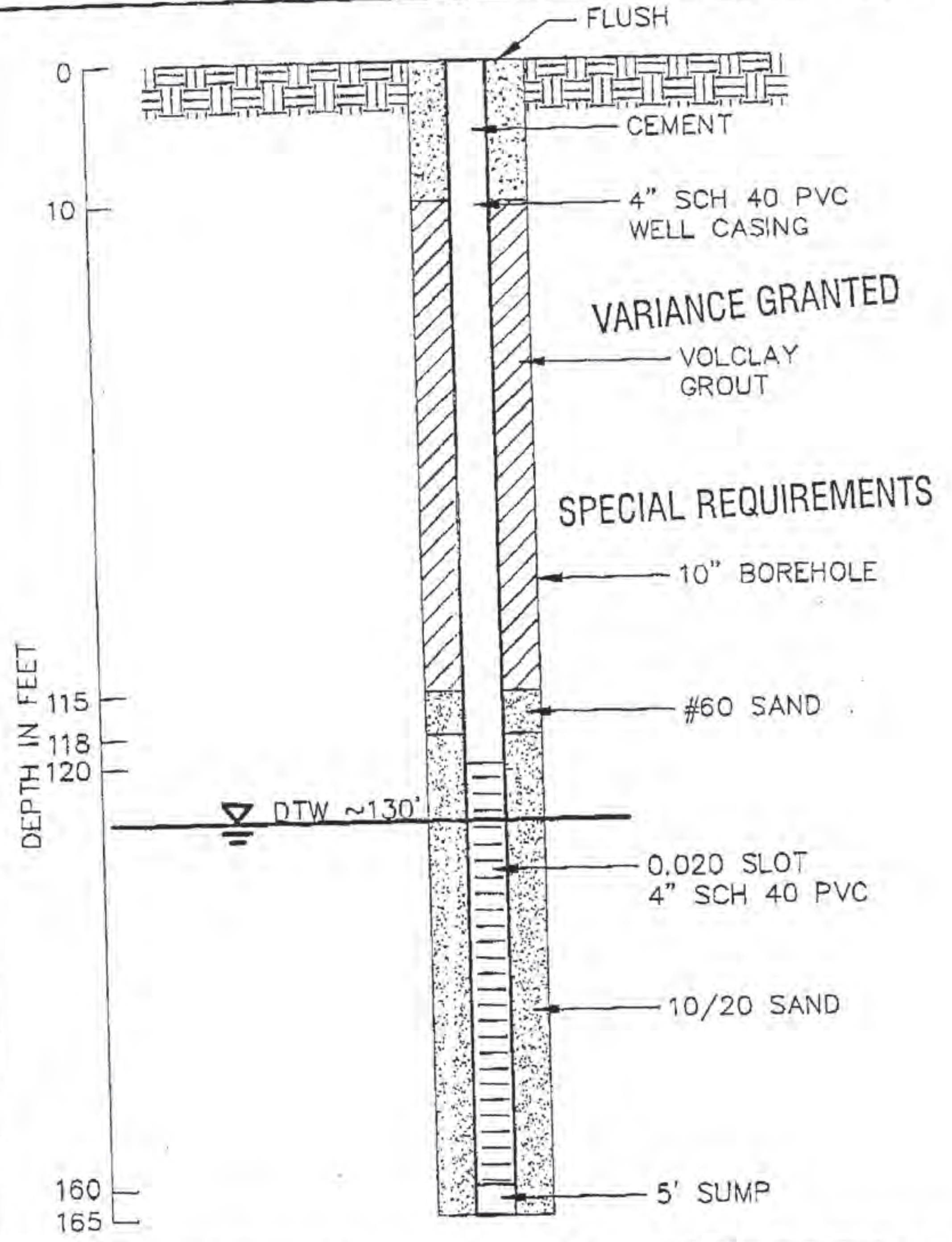
212563



VARIANCE GRANTED

SPECIAL REQUIREMENTS

HYDRO
GEO
CHEM, INC.

GROUNDWATER MONITORING WELL

Approved	Date	Revised	Date	Reference:	FIG.
RP	2/8/06			8331214A	2

Project: COOPER AND COMMERCE WQARF SITE　Boring **MW-105 55-212563** Pg. 1 of 4

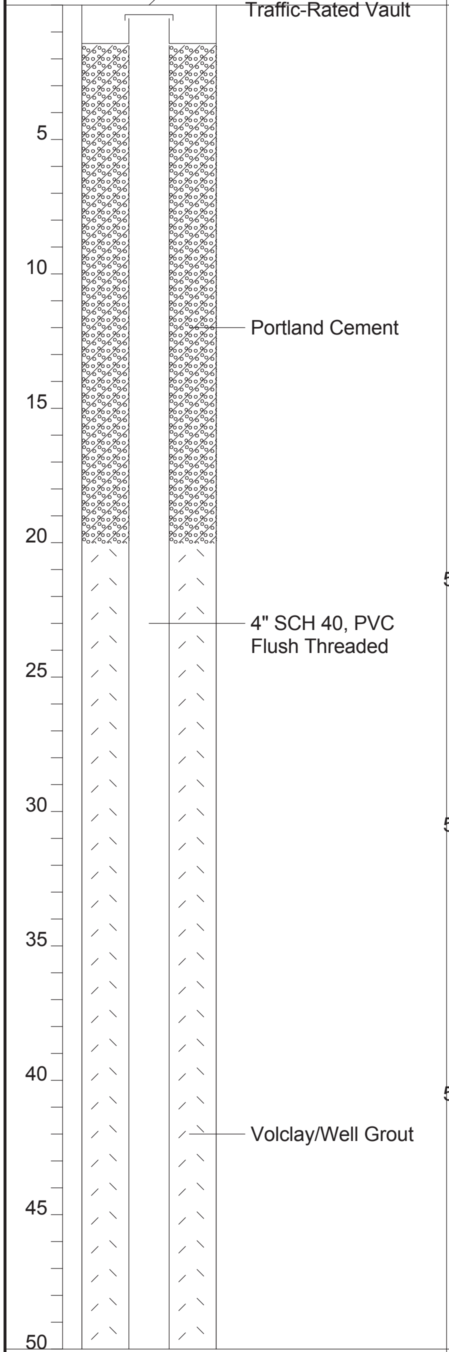
Drilling Co: **Layne Christensen Environmental**　Drilling Method: **Double-Wall Percussion**　Date Started: **6/5/06**

Location: **402 North Neely St.**　Sampler:　Date Completed: **6/6/06**

Desc. of Meas Pt:　Logged by: **N. Babb**

Land Surf. Elev:　Meas. Pt. Elev:　Reviewed by: **M. Arneson**

WELL COMPLETION



Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
10	50 6		1.2			SILT-w/traces of clay and sand, hard, dry, some white mottling, caliche nodules; (7.5YR 7/4).	ML	0	10	90	D
20	25 50/4"		1.0			SILT-w/traces of clay and sand, hard, dry, some white mottling, caliche nodules; (7.5YR 7/4).	ML	0	5	95	D
30	50/3"					No Recovery. Drillers did not use rock catch.					
40	50/5"		1.2			LEAN CLAY- Brown; low to moderate plasticity, some white mottling (caliche), hard & well cemented, dry; (7.5YR 6/4).	CL	0	5	95	D

Lithologic Log and Well Construction Details of MW-105 55-212563

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

HYDRO GEO CHEM, INC.

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.1a

Project: COOPER AND COMMERCE WQARF SITE Boring MW-105 55-212563 Pg. 2 of 4

Drilling Co: Layne Christensen Environmental Drilling Method: Double-Wall Percussion Date Started: 6/5/06

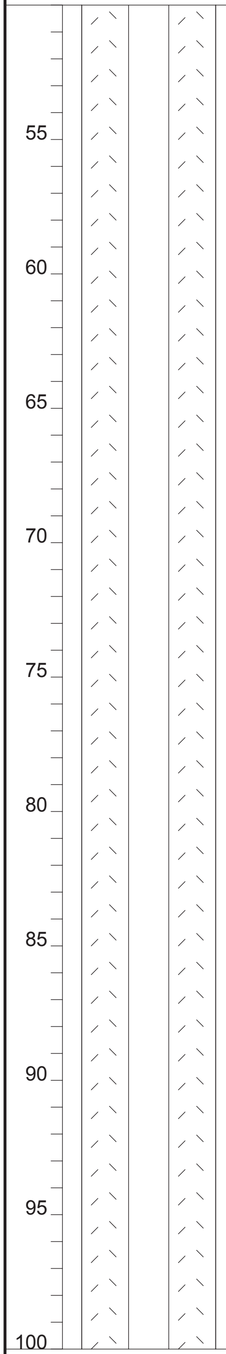
Location: 402 North Neely St. Sampler: Date Completed: 6/6/06

Desc. of Meas Pt: Logged by: N. Babb

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: M. Arneson

WELL COMPLETION

2'x2' Concrete Square Vault, With 12" dia. Flush Mounted Steel Traffic-Rated Vault



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
50/6"		3.3			▨	LEAN CLAY- Brown; medium plasticity, trace silt, dry to moist, hard; (7.5YR 6/4).	CL	0	0	100	D
6 14 13		2.9		60	▨	LEAN CLAY- medium plasticity, medium stiff to stiff, dry to moist, mottled w/caliche; (7.5YR 6/4).	CL	0	5	95	M
5 10 13				70	▨	LEAN CLAY - Low to medium plasticity, medium stiff to stiff, dry to moist, some white mottling (caliche); (7.5YR 7/4).	CL	0	5	95	M
		1.8	G	80		WELL GRADED GRAVEL WITH COBBLES- Sub-angular to Sub-rounded fragments, dry; (10YR 6/3).	GW				D
		2.0	G	90		WELL GRADED GRAVEL WITH COBBLES- Sub-angular to Sub-rounded fragments, dry; (10YR 6/3).	GW	25	75	0	D

HGC-WELL2 833000.GPJ NEWPROJ.GDT 10/30/06

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-105 55-212563

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.1b

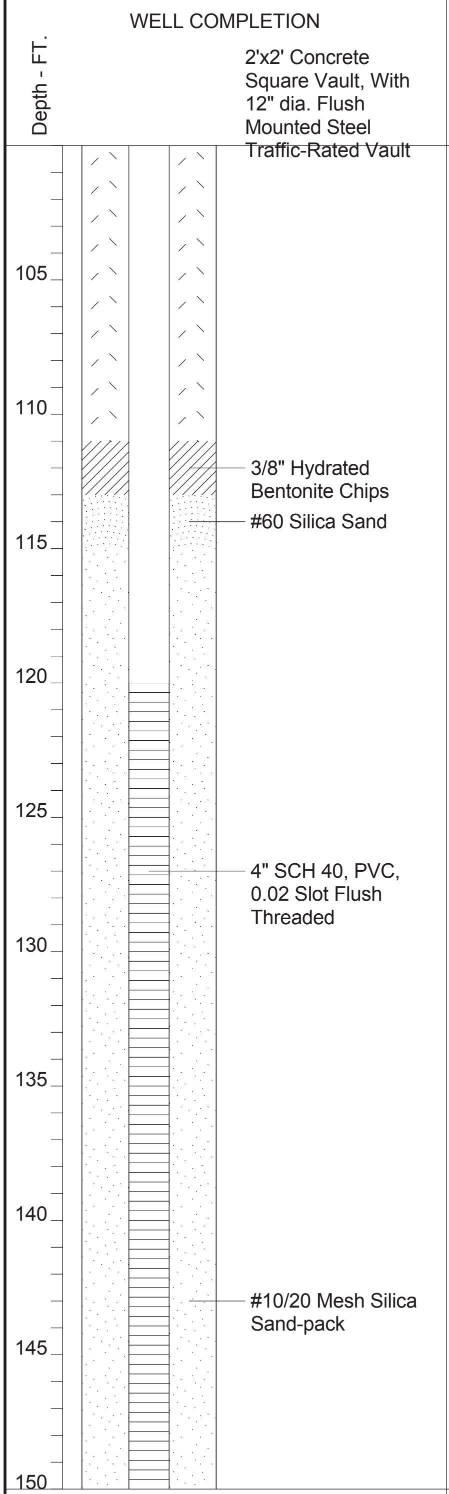
Project: COOPER AND COMMERCE WQARF SITE Boring **MW-105 55-212563** Pg. 3 of 4

Drilling Co: **Layne Christensen Environmental** Drilling Method: **Double-Wall Percussion** Date Started: **6/5/06**

Location: **402 North Neely St.** Sampler: Date Completed: **6/6/06**

Desc. of Meas Pt: Logged by: **N. Babb**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **M. Arneson**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
		1.4	G	105		WELL GRADED GRAVEL WITH SAND AND COBBLES- Sub-angular to Sub-rounded fragments, dry; (7.5YR 4/4). Note: Sample appears to have coarser sand grains than the 90' sample.	GW	25	75	0	D
		1.8	G	110 115		WELL GRADED GRAVEL WITH SAND AND COBBLES- Sub-rounded to sub-angular fragments, dry; (7.5YR 4/4).	GW	50	50	0	D
		1.4	G	120 125		WELL GRADED GRAVEL WITH SAND AND COBBLES- Sub-rounded to sub-angular fragments, dry; (7.5YR 4/4).	SW	25	75	0	D
		1.6	G	130 135		COBBLES WITH GRAVEL AND SAND- Sub-angular to rounded rock fragments, moist to wet; (7.5YR 3/3).	GW	75	25	0	M
		1.6	G	140		COBBLES WITH GRAVEL AND SAND- Sub-angular to rounded rock fragments, moist to wet; (7.5YR 3/3).	GW	75	25	0	M
				145 150		WATER TABLE- Water sludge, evidence of liquidy mud, saturated.					W

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-105 55-212563

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.1c

Project: COOPER AND COMMERCE WQARF SITE

Boring **MW-105 55-212563** Pg. 4 of 4

Drilling Co: **Layne Christensen Environmental**

Drilling Method: **Double-Wall Percussion**

Date Started: **6/5/06**

Location: **402 North Neely St.**

Sampler:

Date Completed: **6/6/06**

Desc. of Meas Pt:

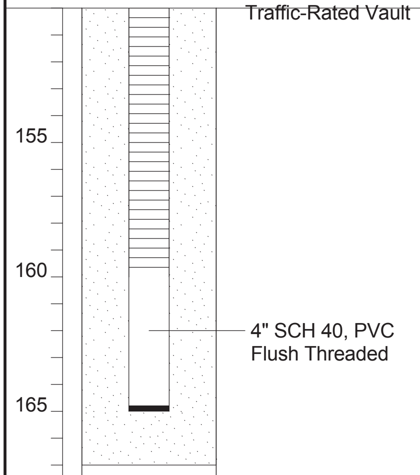
Logged by: **N. Babb**

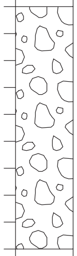
Land Surf. Elev:

Meas. Pt. Elev:

Reviewed by: **M. Arneson**

WELL COMPLETION





Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
				COBBLES WITH SAND- Not as much water exiting the hopper, large cobble w/sand sediment not as fluid as the 142' to 150' bgs interval, saturated.	Vis. Obs				W
				COBBLES WITH SAND- Saturated.	Vis. Obs				
			G	WELL GRADED GRAVEL WITH COBBLES- Sediment getting drier, is only wet, remains this way to the bottom of the borehole @ 167'bls.	GW				

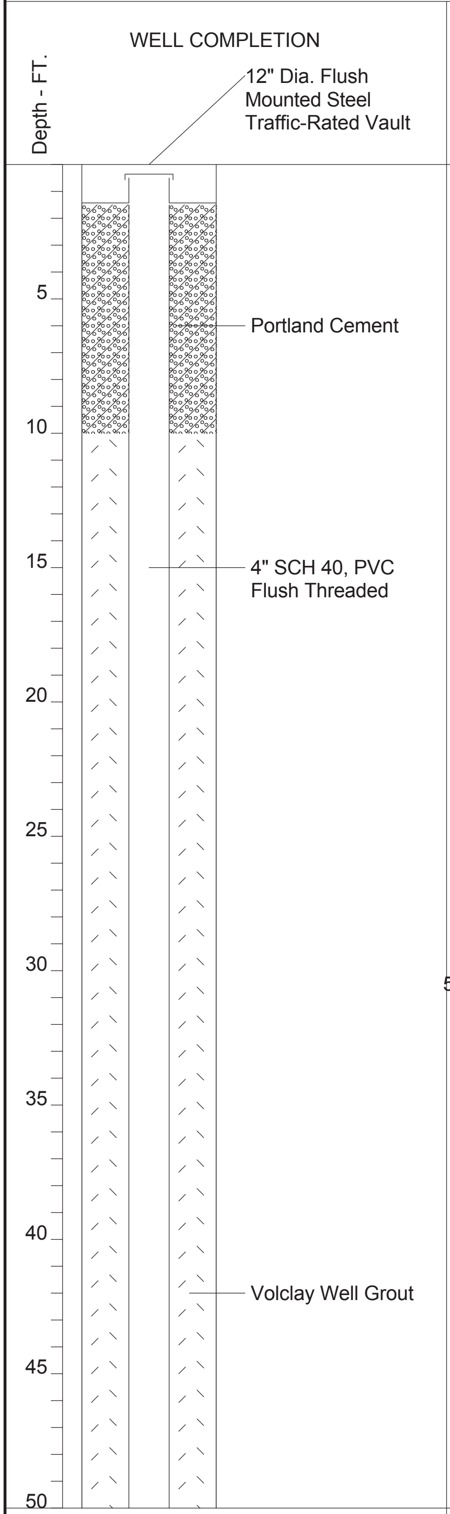
HYDRO GEO CHEM, INC.

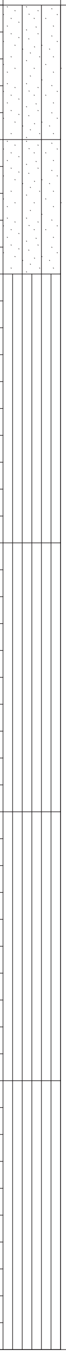
Lithologic Log and Well Construction Details of MW-105 55-212563

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.1d

Project: COOPER AND COMMERCE WQARF SITE
Boring **MW-106 55-212564** Pg. 1 of 4
Drilling Co: Layne Christensen Environmental
Drilling Method: Double-Wall Percussion
Date Started: 9/20/06
Location: 65 feet east of Cooper and 5 feet south of Commerce
Sampler:
Date Completed: 9/21/06
Desc. of Meas Pt:
Logged by: W.Thompson
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: M. Arneson





Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
0				G	SILTY SAND; Pinkish grey. (7.5YR 7/2); dry. Sand fraction is fine to very fine sand. Very strong reaction to HCL.	SM	0	75	25	D
5				G	SILTY SAND; Light yellowish brown. (10YR 6/4); dry. As above except for increase in silt fraction and color change, strong reaction to HCL.	SM	0	60	40	D
10	26 50		0	☒	SILT; Light yellowish brown. (10YR 6/4); non-plastic, dry. Sand fraction is very fine-grained, slight cementation.	ML	0	50	50	D
20	36 50		0	☒	SILT; Light yellowish brown. (10YR 6/4); non-plastic, dry. Sand fraction is very fine-grained, slight to moderate cementation, fairly easy to crumble between fingers, strong reaction to HCL.	ML	0	30	70	D
30	50/6"		0	☒	SILT; Dark brown. (7.5YR 5/4); Non-plastic, damp. Sand fraction is very fine-grained, slightly cohesive; strong reaction to HCL.	ML	0	10	90	M
40	50 20 24		0	☒	SILT; Dark brown. (7.5YR 5/4); non-plastic, damp. Sand fraction is very fine grained; moderate cohesive, slightly sticky; very strong reaction to HCL.	ML	0	5	95	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-106 55-212564

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.2a

Project: COOPER AND COMMERCE WQARF SITE Boring **MW-106 55-212564** Pg. 2 of 4

Drilling Co: Layne Christensen Environmental Drilling Method: Double-Wall Percussion Date Started: 9/20/06

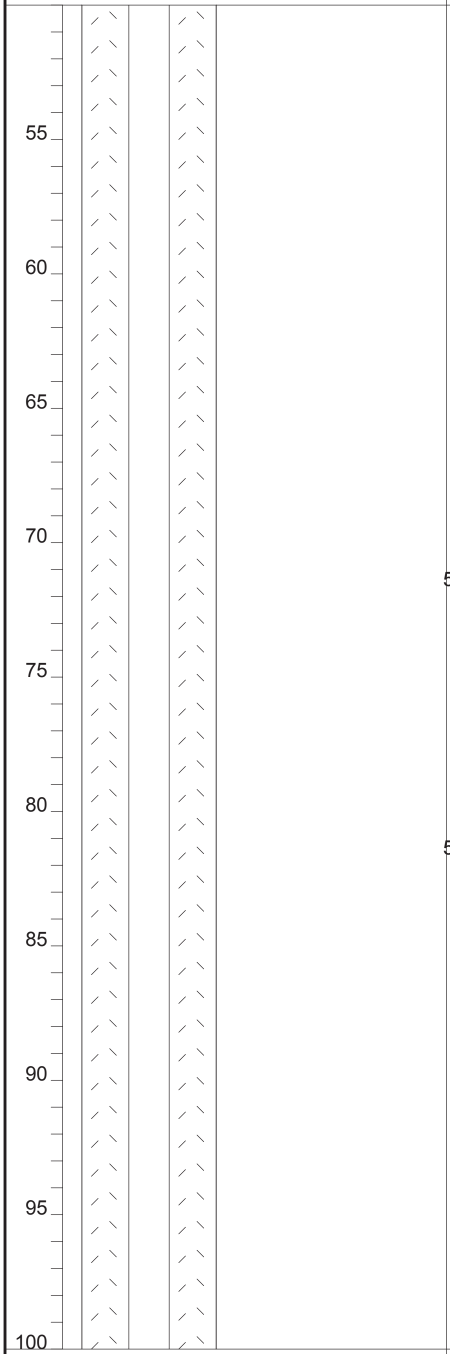
Location: 65 feet east of Cooper and 5 feet south of Commerce Sampler: Date Completed: 9/21/06

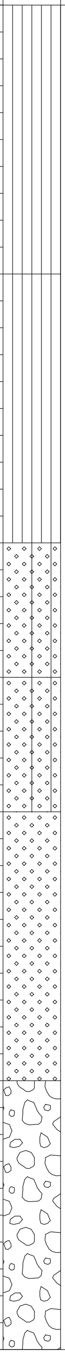
Desc. of Meas Pt: Logged by: W.Thompson

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: M. Arneson

WELL COMPLETION

12" Dia. Flush Mounted Steel Traffic-Rated Vault





Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
50	22 40 41		0	☒	SILT; Dark brown. (7.5YR 5/4); Non-plastic, damp to moist. Moderately cohesive, very slightly plastic; very strong reaction to HCL.	ML	0	5	95	M
60	17 32 38		0	☒	SILT; Dark brown with light brown mottling (7.5YR 5/4); light brown mottling (7.5YR 6/4), slight to moderatly sticky, slightly plastic when worked between hands, damp to moist; very strong reaction to HCL.	ML	0	10	90	M
70	14 52/3"		0	☒	WELL GRADED SAND WITH SILT AND GRAVEL. (7.5YR 5/4); Dark brown. Abrupt change from above material into a fine-grained sand, loose, moist; slightly reactive to HCL.	SW-SM	0	90	10	M
75				G	WELL GRADED SAND WITH SILT AND GRAVEL. (7.5YR 5/3); gravelly, cobbly sand with silt. Cobbles to 5" dia., sub-angular to well rounded, sand fraction is coarse through very fine-grained, fairly well graded through to silt fraction; damp, weak reaction to HCL.	SW-SM	20	70	10	M
80	25 50/5"		0	☒	WELL GRADED SAND WITH GRAVEL. (7.5YR 5/3); Gravelly sand with trace silt. Brown as described above, slight increase in gravel fraction. No sample retrieved in split spoon.	SW	35	60	5	M
90			0	G	WELL GRADED GRAVEL WITH SAND. (7YR 6/4); Light brown, gravel to 3" dia. sub angular to very welll rounded, crystalline volcanics, coloration from light through dark grays, pinks, aphenitic. Sand fraction is coarse through very fine-grained, fairly well graded, dry. Sand fraction has weak reaction to HCL.	GW	70	30	0	D

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-106 55-212564

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.2b

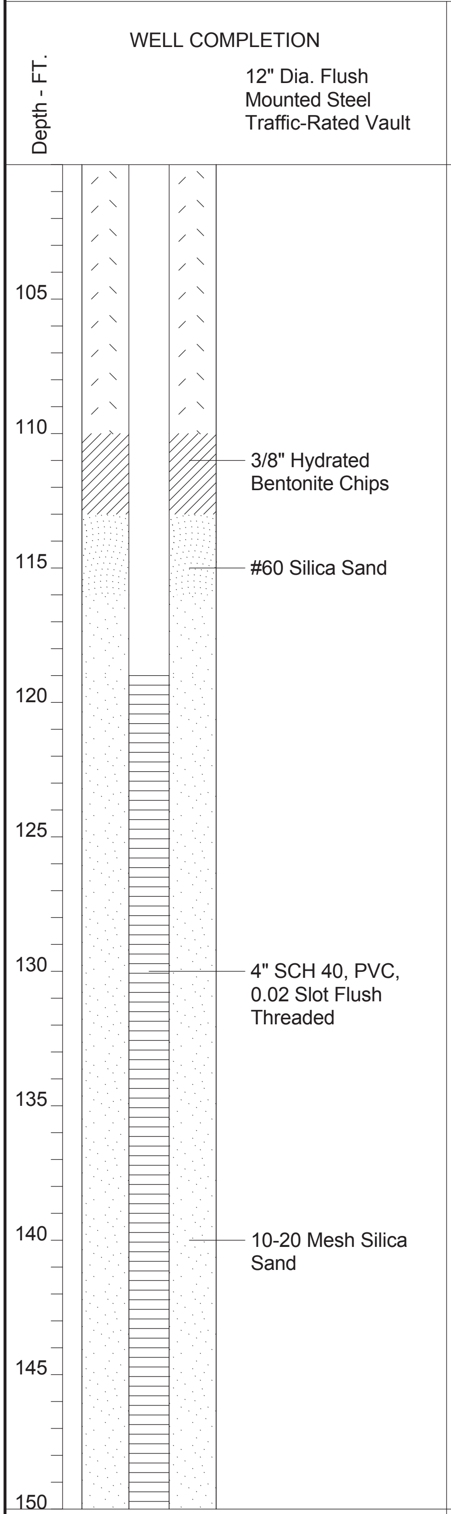
Project: COOPER AND COMMERCE WQARF SITE　Boring **MW-106 55-212564** Pg. 3 of 4

Drilling Co: **Layne Christensen Environmental**　Drilling Method: **Double-Wall Percussion**　Date Started: **9/20/06**

Location: **65 feet east of Cooper and 5 feet south of Commerce**　Sampler:　Date Completed: **9/21/06**

Desc. of Meas Pt:　Logged by: **W.Thompson**

Land Surf. Elev:　Meas. Pt. Elev:　Reviewed by: **M. Arneson**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
		0	G	105		WELL GRADED GRAVEL WITH SAND. (7.5YR 5/4); sandy gravel as described above except for increase in sand fraction, color changes to a brown (sand), damp; no reaction to HCL.	GW	60	40	0	M
		0	G	110 115		WELL GRADED SAND WITH GRAVEL. (7.5YR 6/4); light brown. Gravel fraction to 3" max dia., few cobbles to 6" dia. sub-angular to well rounded; sand fraction is medium to very fine-grained, failry well graded, damp. No reaction to HCL.	SW	40	60	0	M
			G	120 125		WELL GRADED SAND WITH GRAVEL. (7.5YR 4/4); Brown, similar to above except that sand fraction is very coarse through very fine-grained, well graded; moist. No reaction to HCL.	SW	40	60	0	M
			G	130 135		WELL GRADED SAND WITH GRAVEL. (10YR 5/4); hit water at this depth. As above except that cuttings are saturated; color change to yellowish brown. Cobbles to 8" dia., well rounded.	SW	40	60	0	W
			G	140 145 150		WELL GRADED SAND WITH GRAVEL. (10YR 5/4); gravelly sand with a trace silt. Yellowish brown, gravel fraction to 3" dia. sub-angular to well rounded, few cobbles are elongated smooth and flat, few cobbles to 8" dia. Sand fraction is coarse through very fine-grained, fairly well graded through to trace slit fraction, saturated. No reaction to HCL.	GW	50	45	5	W

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-106 55-212564

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.2c

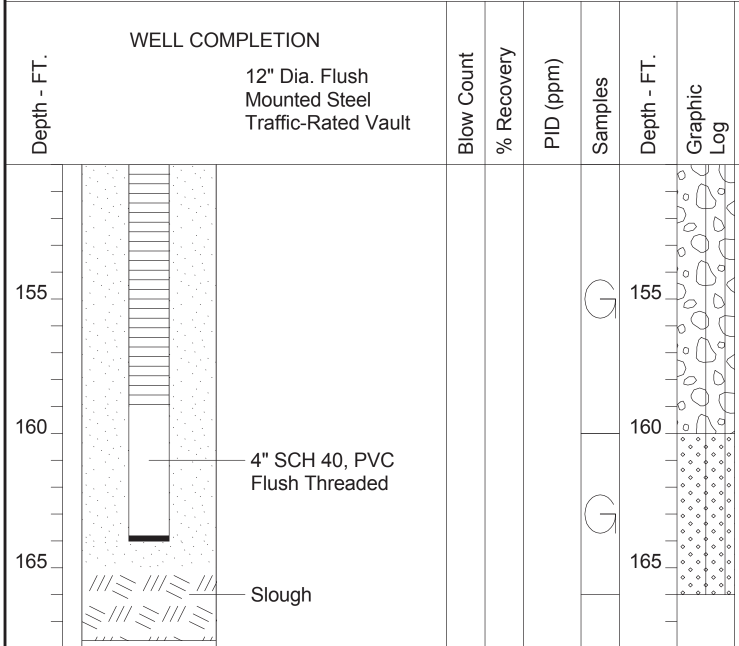
Project: COOPER AND COMMERCE WQARF SITE Boring **MW-106 55-212564** Pg. 4 of 4

Drilling Co: **Layne Christensen Environmental** Drilling Method: **Double-Wall Percussion** Date Started: **9/20/06**

Location: **65 feet east of Cooper and 5 feet south of Commerce** Sampler: Date Completed: **9/21/06**

Desc. of Meas Pt: Logged by: **W.Thompson**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **M. Arneson**



DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
WELL GRADED GRAVEL WITH SILT AND SAND. (7.5YR 5/3); Brown, gravel fraction to 2" max. dia. sub-angular to well rounded. Sand fraction is coarse through fine-grained, fairly well graded, wet, sticky, cohesive. No reaction to HCL.	GW-GM	30	60	10	W
WELL GRADED SAND WITH SILT AND GRAVEL. (7.5YR 5/3); as described above except for increase in gravel fraction and decrease in sand fraction, saturated.	SW-SM	40	50	10	W
LEAN CLAY. (7.5YR 5/3); sand, silt, clay with trace gravel. Brown, gravel fraction fine-grained; half inch dia. max. Well rounded, sand fraction is medium to fine-grained, moderately plastic, cohesive, sticky, wet. Slight reaction to HCL. Total depth to 167.7' bls.	CL-ML	10	40	50	W

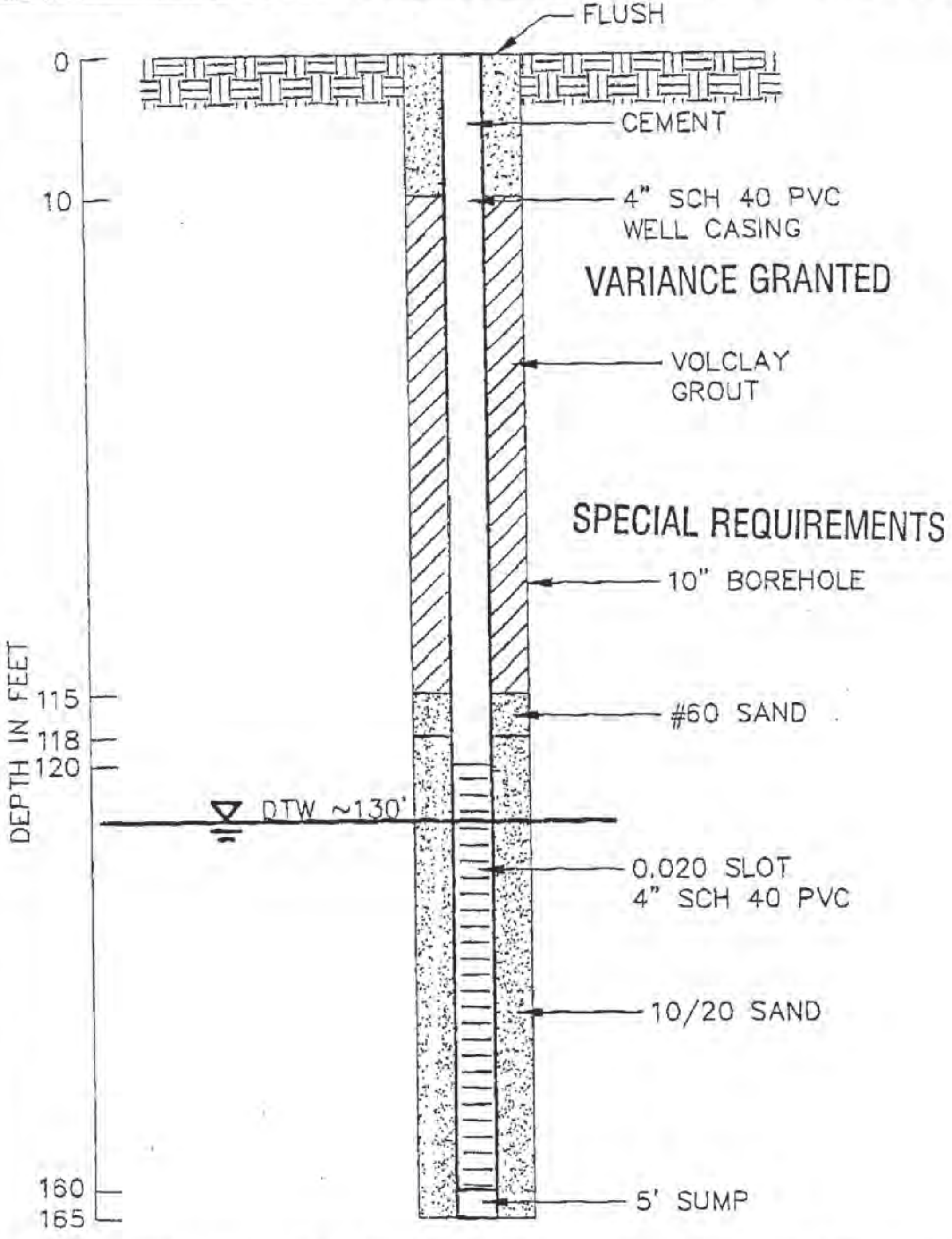
HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of MW-106 55-212564

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
AE	10/18/06			H:\833000\gINT	C.2d

212564



VARIANCE GRANTED

SPECIAL REQUIREMENTS

HYDRO GEO CHEM, INC.

GROUNDWATER MONITORING WELL

Approved	Date	Revised	Date	Reference:	FIG.
RP	2/6/06			8331214A	2

HYDRO GEO CHEM, INC.

Geologic Boring Log

Page 1 of 4

Site Plan at Boring Location: Approx. 120 ft west of the intersection at Golden Key & Monteray (southeast direction from the intersection at Cooper an Commerce Roads).

City and State: Gilbert, AZ

Township, Range, Section: 1S, 5E, S12

Well Registration: 55-906992

Drilling Equipment: AP-1000

Drilling Method:Dual-wall percussion hammer rig

Well Number: **MW-107**

Bit Type: 5-point bit Size: 10" in.

Started, Time: 10:10 Date: 5-14-07

Completed, Time: 13:00 Date: 5-15-07

Casing Depth (Ft): 165

Boring Depth (Ft): 167

Screened Interval (Ft): 110-160

Water Depth (Ft): 120.78 bgs Date: 5-15-07

Logged By: NJ. Babb Date: 5/14 -15/07

Checked By: K. Ross Date: 6-12-07

Depth (Ft)	Blow Counts	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	PID (ppm)	Sample Description
0	Vis. Obs.	*****	*****	*****	*****************	**********	*******	3-INCHES OF ASPHALT- followed by A/B fill.
1								
2								
3								
4								
5								
6								
7								
8								
9								
10	35, 50/5	0	10	90	CL	7.5YR 4/4	0	CLAY- w/sand, brown w/white caliche, very stiff to hard,
11						7.5 YR 8/1		dry, medium to high dry strength, medium to high plasticity,
12								moderate cementation, moderate HCL RXN.
13								
14								
15								
16								
17								
18								
19								
20	36, 50/3	0	10	90	CL	7.5YR 5/4	0	LEAN CLAY- w/sand, brown, hard, dry, none to low dry
21								strength, low to medium plasticity, low cementation,
22								moderate HCL RXN.
23								
24								
25								
26								
27								*Drillers added water to boring.
28								
29								SILT- w/clay & sand, very pale brown, hard, dry, med. dry
30	50/3	0	10	90	ML	10YR 7/3	0	strength, no plasticity, strong cementation, strong HCL RXN.

Project Name: Cooper and Commerce Project No.: 83308 Boring No.: MW-107 Page 2 of 4

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Logged By: NJ. Babb	Date: 5-14-07
		GR	SA	FI				Checked By: K. Ross	Date: 6-12-07
31									
32									
33									
34									
35									
36									
37									
38									
39									
40	13, 15, 16	0	5	95	CL	5YR 4/6	0	CLAY- w/silt and fine sand mottled w/caliche, yellowish-red,	
41						5YR 8/1		stiff to very stiff, moist, low dry strength, med plasticity, weak	
42								cementation, strong HCL RXN.	
43									
44									
45									
46									
47									
48									
49									
50	14, 50/6	0	0	100	CL	5YR 6/6	0	CLAY- w/silt, reddish-yellow, stiff to hard, moist, medium dry	
51								strength, medium plasticity, moderate cementation, weak HCL	
52								RXN.	
53									
54									
55									
56									
57									
58									
59									
60	14, 50/6	0	0	100	CL	7.5YR 6/4	0	CLAY- w/silt, mottled w/caliche, lt. brown, stiff to hard, dry to	
61						7.5YR 8/1		moist, no dry strength, medium to high plasticity, weak	
62								cementation, strong HCL RXN.	
63									
64									
65									
66									
67									
68									
69									
70	4, 10, 15	0	0	100	CL	7.5YR 5/4	2.2	CLAY- w/silt, brown, soft to stiff, moist, no dry strength, high	
71								plasticity, weak cementation, no HCL RXN.	
72									
73								*Encountered large cobble, only grab samples to total depth.	
74									
75									

Project Name: Cooper and Commerce Project No. 83308 Boring No. MW-107 Page 3 of 4

Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb	Date: 5-14-07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross	Date: 6-12-07
76									
77									
78									
79									
80	Vis. Obs.	No Recovery			Large Cobble	N/A	0	COBBLE - w/ large sub-angular to sub-rounded fragments,	
81								dry.	
82									
83									
84									
85									
86									
87									
88									
89									
90	Grab	80	20	0	GW w/cobble	7.5YR 6/2	0	WELL GRADED GRAVEL- w/sand & cobble, sub-	
91								rounded to sub-angular fragments, pinkish-gray, dry.	
92									
93									
94									
95									
96									
97									
98									
99									
100	Grab	10	85	5	SW	10YR 6/3	0	WELL GRADED SAND- w/sub-rounded to sub-angular	
101								fragments, pale brown, dry.	
102									
103									
104									
105									
106									
107									
108									
109									
110	Grab	20	70	10	SM	7.5YR 6/3	0	WELL GRADED SAND- w/silt & gravel, sub-rounded to	
111								sub-angular fragments, lt. brown, dry.	
112									
113									
114									
115									
116									
117									
118									
119								WELL GRADED SAND- w/silt & gravelly cobble, sub-	
120	Grab	30	60	10	SM	7.5YR 6/3	0	rounded to sub-angular fragments, light brown, dry.	

Project Name: Cooper and Commerce Project No. 83308 Boring No. MW-107 Page 4 of 4

Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb	Date: 5/14-15/07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross	Date: 6-12-07
121									
122									
123									
124									
125									
126									
127									
128									
129									
130	Grab	80	10	10	GM	7.5YR 3/2	0	WELL GRADED GRAVEL- w/silt & sand, sub-rounded to	
131								sub-angular fragments, dark brown, wet.	
132									
133									
134									
135									
136									
137									
138	Vis.Obs.	*****************			*****************	*********	******	*Encountered water table.	
139									
140	Grab	90	5	5	GW	7.5YR 6/3	0	WELL GRADED GRAVEL- W/silt & cobble, sub-rounded	
141								to sub-angular fragments, light brown, saturated.	
142	Vis.Obs.		N/A		Water Table	N/A	N/A	*Evidence of liquidy mud/slurry exiting the hopper,	
143								saturated.	
144	Vis.Obs.		N/A		Water Table	N/A	N/A	*Note encountered very large cobble/boulders, very	
145								liquidy mud/slurry, saturated.	
146									
147	Vis.Obs.		N/A		Water Table	N/A	N/A	Watery sludge, saturated.	
148									
149									
150	Grab	30	50	20	GM	7.5YR 3/2	0	WELL GRADED GRAVEL- w/silt & sand, sub-rounded to	
151								sub-angular fragments, dark brown, wet.	
152									
153									
154									
155	Vis.Obs.		N/A		Cobble w/sand	N/A	N/A	Sub-rounded to sub-angular fragments, saturated.	
156									
157									
158									
159									
160	Grab	Water Table			Cobble w/sand	7.5YR 4/3	0	Cobble - w/sand & gravel, brown, saturated.	
161									
162									
163									
164									
165	Vis.Obs.	30	20	50	SM	7.5YR 4/4	0	WELL GRADED SAND- w/silt & gravel, brown, moist.	
166									
167								Total Depth of Boring = 167' ft. bgs	

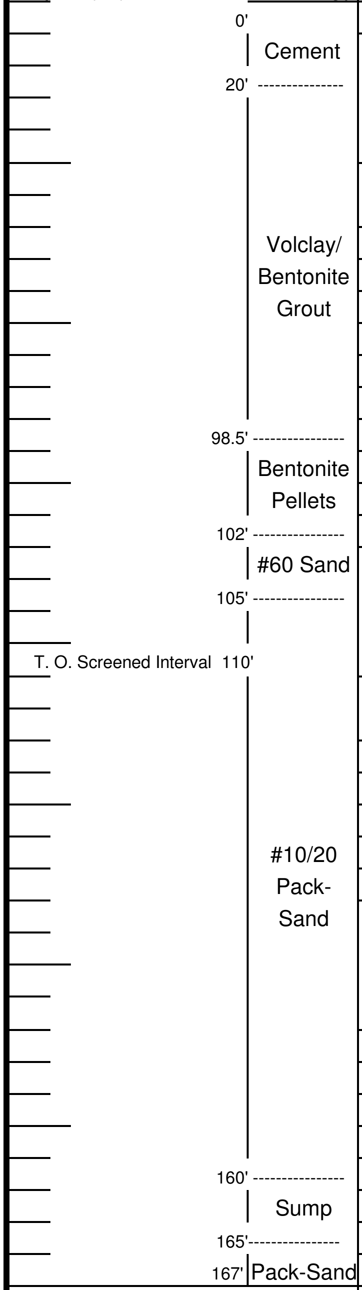
HYDRO GEO CHEM, INC.

Well Construction Summary

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation   Boring No.: MW-107
Drilling Company: Layne Christenson Co.   Driller: Perry Hormann   Project No.: 83308
ADWR Well Registration No.: 55-906992   Geologist: NJ. Babb
Location: Approximately 120 feet west of the intersection at Golden Key & Monteray Streets

AS-BUILT DIAGRAM

Depth (Ft)   Lithology



DRILLING SUMMARY

Total Depth: 167 ft.   Hole Diameter: 10" in.
Drill Rig: AP-1000   Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50 ft Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0ft bgs	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 167 ft to 105 ft bls
Filter Pack Material: #60 choke/ transition pack-sand	Interval: 105 ft to 102 ft bls
Screen Seal Layer: Bentonite pellets	Interval: 102 ft to 98.5 ft bls
Grout: Volclay/Bentonite Slurry	Interval: 98.5 ft to 20 ft bls
Cement: Portland	Interval: 20 ft to 0 ft bls

Surface Completion: 4 ft x 6 ft concrete-pad with 12-inch diameter traffic vault and metal lid.
*Measuring Point of T. O. C is approx. 0 inches above asphalt-paved surface grade.

CONSTRUCTION TIME LOG

MW-107	Start Date: 5/14/07 Time: 10:15	Finish Date: 5/15/07 Time: 13:00
Drilling: 167 ft / 6.75 hrs	5/14/07 @ 10:15	5/15/07 @ 7:00
Casing: 165 ft / 0.5 hrs	5/15/07 @ 7:15	5/15/07 @ 7:45
Filter Pack: 69.5 ft / 1.75 hrs	5/15/07 @ 7:45	5/15/07 @ 9:30
Cement & Bentonite Slurry	5/15/07 @ 10:15	5/15/07 @ 11:30
Surface Completion	5/15/07 @ 12:00	5/15/07 @ 13:00

WELL DEVELOPMENT

Date & Time Started: 6/6/07 @ 8:10   Date & Time Completed: 6/6/07/07 @ 11:25
a = Cased Depth (ft): 165 f   d = Casing Diameter (in.): 4 in.
b = Water Depth (ft): 121.6   Date & Time Measured: 6/6/07 @ 8:10
Well Volume = (a - b) x d² x 0.0408 = 28.27 Gallons
Method of Development: 3" in. grundfos submersible pump
Swabbed and Bailed for: 90 minutes
Pumped at: 10 gpm for 45 minutes

Remarks: Gallons Purged: 484 gallons

HYDRO GEO CHEM, INC.

Geologic Boring Log

Site Plan at Boring Location: West side of Laguna Ave at the inter- of Laurel Ave & Laguna Ave (south-southwest direction from the intersection at Cooper and Commerce Roads).

City and State: Gilbert, AZ

Township, Range, Section: 1S, 5E, S11

Well Registration: 55-907007

Drilling Equipment: AP-1000

Drilling Method:Dual-wall percussion hammer rig

Well Number: **MW-108**

Bit Type: 5-point bit Size: 10" in.

Started, Time: 7:45 Date: 5-16-07

Completed, Time: 15:00 Date: 5-16-07

Casing Depth (Ft): 165

Boring Depth (Ft): 167

Screened Interval (Ft): 110-160

Water Depth (Ft): 116.52 bgs Date: 5-17-07

Logged By: NJ. Babb Date: 5/16-17/07

Checked By: K. Ross Date: 6-12-07

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Sample Description
		GR	SA	FI				
0	Vis. Obs.	*****	*****	*****	*****************	**********	*******	3-INCHES OF ASPHALT- followed by A/B fill.
1								
2								
3								
4								
5	Grab	0	20	80	ML	7,5YR 5/4	0	SILT- w/sand, brown, moist, none to low dry strength, low
6								plasticity, low to medium toughness, moderate HCL RXN.
7								
8								
9								
10	35, 50/6	0	10	90	ML	7,5YR 5/4	0	SILT- w/ traces of clay and sand, brown, mottled w/ caliche,
11						7,5YR 8/1		hard, dry to moist, low to medium dry strength, low plasticity,
12								low toughness, strong HCL RXN.
13								
14								
15								*Added water to boring.
16								
17								
18								
19								
20	50/3	0	5	95	CL	7.5YR 6/4	0	LEAN CLAY- mottled w/caliche, light brown, dry, very high
21						7,5YR 8/1		dry strength, no plasticity, strong HCL RXN.
22								
23								
24								
25								
26								
27								
28								
29								CLAY- w/sand, brown, very stiff, dry to moist, low dry
30	18, 23, 24	0	5	95	CL	7.5YR 5/4	0	strength, medium plasticity, moderate HCL RXN.

Project Name: Cooper and Commerce Project No.: 83308 Boring No.: MW-108 Page 2 of 4

Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb	Date: 5-16-07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross	Date: 6-12-07
31									
32									
33									
34									
35									
36									
37									
38									
39									
40	11, 11, 17	0	5	95	ML	7.5YR 6/6	0	SILT- reddish-yellow, stiff to very stiff, dry to moist, no dry	
41								strength, none to low plasticity, low toughness, weak HCL RXN.	
42									
43									
44									
45									
46									
47									
48									
49									
50	8, 10, 10	0	5	95	ML	7.5YR 6/6	0	SILT- reddish-yellow, medium stiff to stiff, dry to moist, low	
51								dry strength, low plasticity, low toughness, no HCL RXN.	
52									
53									
54									
55									
56									
57									
58									
59									
60	7, 10, 18	0	5	95	CL	7.5YR 6/4	0	LEAN CLAY- light brown, medium stiff to very stiff, dry, no	
61								dry strength, medium plasticity, no HCL RXN.	
62									
63									
64								*Encountered large cobble, only grab samples to total depth.	
65									
66									
67									
68									
69									
70	Vis. Obs.	No Recovery			Large Cobble	N/A	N/A	COBBLE - w/ large sub-angular to sub-rounded fragments,	
71								dry.	
72									
73									
74									
75									

Project Name: Cooper and Commerce Project No. 83308 Boring No. MW-108 Page 3 of 4

Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb Date: 5-16-07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross Date: 6-12-07
76								
77								
78								
79								
80	Grab	40	60	0	SP	7.5YR 6/3	0	WELL GRADED SAND- w/gravel, light brown, dry, sub-
81								rounded to sub-angular fragments, no HCL RXN.
82								
83								
84								
85								
86								
87								
88								
89								
90	Grab	20	80	0	SP	7.5YR 5/3	0	WELL GRADED SAND- w/cobbly gravel, brown, dry, sub-
91								rounded to sub-angular fragments, no HCL RXN.
92								
93								
94								
95								
96								
97								
98								
99								
100	Grab	25	70	5	SM	7.5YR 5/3	0	WELL GRADED SAND- w/silt & cobbly gravel, brown, dry,
101								sub-rounded to sub-angular fragments, no HCL RXN.
102								
103								
104								
105								
106								
107								
108								
109								
110	Grab	30	70	0	SM	7.5YR 3/3	0	WELL GRADED SAND- w/cobbly gravel, dark brown,
111								moist, sub-rounded to sub-angular fragments, no HCL RXN.
112								
113								
114								
115								
116								
117								
118								
119								WELL GRADED SAND- w/cobbly gravel, brown, dry, sub-
120	Grab	40	60	0	SM	7.5YR 5/3	0	rounded to sub-angular fragments, no HCL RXN.

Project Name: Cooper and Commerce Project No.: 83308 Boring No.: MW-108 Page 4 of 4

Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb Date: 5-16-07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross Date: 6-12-07
121								
122								
123								
124								
125								
126								
127								
128								
129								
130	Grab	30	70	0	SM	7.5YR 4/3	0	WELL GRADED SAND- w/cobbly gravel, brown, moist,
131								sub-rounded to sub-angular fragments, no HCL RXN.
132								
133								
134								
135								
136								
137								
138								
139								
140	Grab	30	60	10	SC	7.5YR 3/3	0	WELL GRADED SAND- w/clay & gravel, dark brown, wet,
141								sub-rounded to sub-angular fragments, no HCL RXN.
142								
143	Vis.Obs							*Appears to have encountered the water table
144								
145								
146								
147								
148								
149								
150	Grab	80	0	20	GW	7.5YR 5/3	0	WELL GRADED GRAVEL- w/clay, brown, wet, sub-
151								rounded to sub-angular fragments, no HCL RXN.
152								
153								
154								
155								
156								
157								
158								
159								
160	Grab	60	20	20	GW	7.5YR 5/3	0	WELL GRADED COBBLY GRAVEL- w/clay & sand,
161								brown, moist to wet, sub-rounded to sub-angular fragments, no
162								HCL RXN.
163								
164	Vis.Obs	No Recovery			Large Cobble	N/A	N/A	Cobble- w/ sub-angular to sub-rounded fragments, saturated.
165								
166	Vis.Obs	No Recovery			Large Cobble	N/A	N/A	Cobble- w/ sub-angular to sub-rounded fragments, saturated.
167	*********	******	*******	******	Saturated	*********	*******	*Total Depth of Boring = 167' ft. bgs

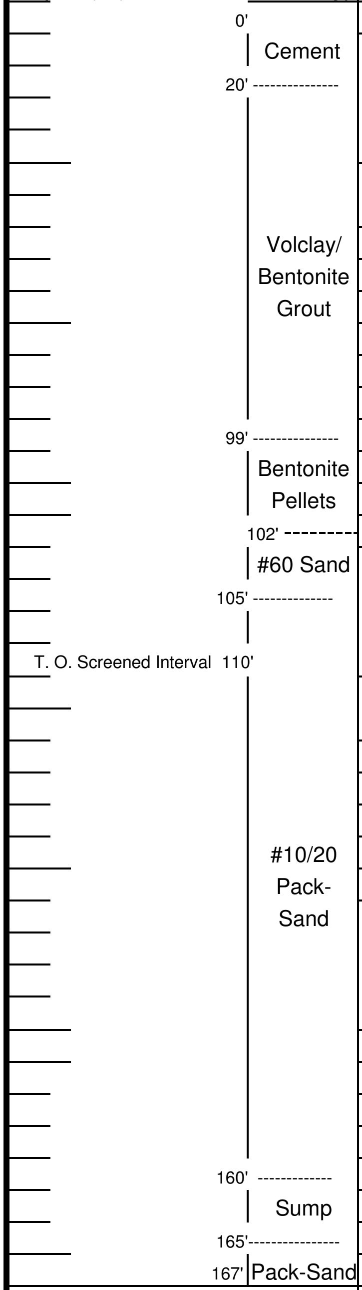
HYDRO GEO CHEM, INC.

Well Construction Summary

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation Boring No.: MW-108
Drilling Company: Layne Christenson Co. Driller: Perry Hormann Project No.: 83308
ADWR Well Registration No.: 55-907007 Geologist: NJ. Babb
Location: Approx. 20 ft west of the intersection at Laurel & Laguna Avenues along the west side of Laguna.

AS-BUILT DIAGRAM

Depth (Ft) Lithology



DRILLING SUMMARY

Total Depth: 167 ft. Hole Diameter: 10" in.
Drill Rig: AP-1000 Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50 ft Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0ft bgs)	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 167 ft to 105 ft bls
Filter Pack Material: #60 choke/ finer pack-sand	Interval: 105 ft to 102 ft bls
Screen Seal Layer: Bentonite medium chips	Interval: 102 ft to 99' ft bls
Grout: Volclay/Bentonite Slurry	Interval: 99 ft to 20 ft bls
Cement: Portland	Interval: 20 ft to 0 ft bls

Surface Completion: 4 ft x 6 ft concrete-pad with 12-inch diameter traffic vault and metal lid.
*Measuring Point of T. O. C is approx. 0 inches above asphalt-paved surface grade.

CONSTRUCTION TIME LOG

MW-108	Start Date: 5/16/07 Time: 7:45	Finish Date: 5/17/07 Time: 14:45
Drilling: 167 ft / 7.25 hrs.	5/16/07 @ 7:45	5/16/07 @ 15:00
Casing: 165 ft / 0.5 hrs	5/16/07 @ 15:15	5/16/07 @ 15:45
Filter Pack: 68 ft / 1.75 hrs	5/17/07 @ 7:15	5/17/07 @ 9:30
Cement & Bentonite Slurry	5/17/07 @ 10:00	5/17/07 @ 11:00
Surface Completion	5/17/07 @ 11:45	5/17/07 @ 14:45

WELL DEVELOPMENT

Date & Time Started: 6/7/07 @ 12:05 Date & Time Completed: 6/7/07 @ 16:00
a = Cased Depth (ft): 165 ft d = Casing Diameter (in.): 4 in.
b = Water Depth (ft): 117.5 Date & Time Measured: 6/7/07/07 @ 12:05
Well Volume = (a - b) x d² x 0.0408 = 30.96 Gallons
Method of Development: 3" in. grundfos submersible pump
Swabbed and Bailed for: 70 minutes
Pumped at: 7.5 gpm for 65 minutes
Pumped at: 7 gpm for 25 minutes
Pumped at: 2 gpm for 20 minutes Gallons Purged: 730 gallons

Remarks:

HYDRO GEO CHEM, INC.

Geologic Boring Log

Page 1 of 4

Site Plan at Boring Location: Along south side of Surfside Drive b/t 77 and 769 Surfside (southwest direction from the intersection at Cooper and Commerce Roads).

City and State: Gilbert, AZ

Township, Range, Section: 1S, 5E, S11

Well Registration: 55-907008

Drilling Equipment: AP-1000

Drilling Method:Dual-wall percussion hammer rig

Well Number: **MW-109**

Bit Type: 5-point bit Size: 10" in.

Started, Time: 10:15 Date: 5-21-07

Completed, Time: 16:30 Date: 5-21-07

Casing Depth (Ft): 165

Boring Depth (Ft): 167

Screened Interval (Ft): 110-160

Water Depth (Ft): 117.35 bgs Date: 5-22-07

Logged By: NJ. Babb Date: 5-21-07

Checked By: K. Ross Date: 6-12-07

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Sample Description
		GR	SA	FI				
0	Vis. obs.							3" INCHES ASPHALT- followed by A/B fill.
1								
2								
3								
4								
5	Grab	0	15	85	CL	7.5YR 6/4	0	LEAN CLAY- w/sand mottled w/pinkish-white caliche, light
6						7.5YR 8/2		brown, dry, no dry strength, medium to high plasticity, low to
7								medium toughness, moderate to strong HCL RXN.
8								
9								
10	25,44,28/3	0	20	80	ML	7.5YR 6/6	0	SILT- w/sand mottled w/pink caliche, reddish-yellow, very
11						7.5YR 8/5		stiff to hard, dry, low to medium dry strength, medium plastic-
12								ity, medium toughness, moderate HCL RXN.
13								
14								
15								
16								
17								
18								
19								
20	50/4	0	25	75	ML	7.5YR 6/4	0	SILT- w/sand, light brown, hard, dry, high dry strength, none
21								to low plasticity, weak HCL RXN.
22								
23								
24								
25								
26								
27								
28								
29								POORLY GRADED FINE SAND- light brown, hard, dry,
30	50/6	0	95	5	SP	7.5YR 6/4	0	no dry strength, no plasticity, no HCL RXN.

Project Name: Cooper and Commerce | Project No.: 83308 | Boring No.: MW-109 | Page 2 of 4

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Logged By: NJ. Babb Date: 5-21-07
		GR	SA	FI				Checked By: K. Ross Date: 6-12-07
31								
32								
33								
34								
35								
36								
37								
38								
39								
40	13, 21, 14	0	10	90	CL	7.5YR 5/4	0	LEAN CLAY- w/sand, brown, stiff to very stiff, moist, med-
41								ium dry strength, high plasticity, medium to high toughness,
42								weak to moderate HCL RXN.
43								
44								
45								
46								
47								
48								
49								
50	16, 50/6	0	40	60	ML	7.5YR 6/4	0	SANDY SILT- light brown, very stiff to hard, dry to moist,
51								low dry strength, medium plasticity, strong HCL RXN.
52								
53								
54								
55								
56								
57								
58								
59								
60	9, 7, 11	0	40	60	CL	7.5YR 5/4	0	SANDY LEAN CLAY- brown, medium stiff to stiff, moist, no
61								to low dry strength, medium plasticity, low toughness, no HCL
62								RXN.
63								*Encountered large cobble, only grab samples to total depth.
64								
65								
66								
67								
68								
69								
70	Grab	50	30	20	GC	7.5YR 5/3	0	WELL GRADED GRAVEL- w/clay & sand, brown, dry,
71								sub-rounded to sub-angular fragments, no HCL RXN.
72								
73								
74								
75								

Project Name: Cooper and Commerce						Project No. 83308		Boring No. MW-109	Page 3 of 4
Depth	Blow	Estimated %			USCS	Munsell	PID	Logged By: NJ. Babb	Date: 5-21-07
(Ft)	Counts	GR	SA	FI	Symbol	Color	(ppm)	Checked By: K. Ross	Date: 6-12-07
76									
77									
78									
79									
80	Grab	20	75	5	SW	7.5YR 6/3	0	WELL GRADED SAND- w/gravel, light brown, dry, sub-	
81								rounded to sub-angular fragments, no HCL RXN.	
82									
83									
84									
85									
86									
87									
88									
89									
90	Grab	25	50	25	SC	7.5YR 5/3	0	WELL GRADED SAND- w/clay & gravel, brown, dry to	
91								moist, sub-rounded to sub-angular fragments, no HCL RXN.	
92									
93									
94									
95									
96									
97									
98									
99									
100	Grab	60	30	10	GM	7.5YR 5/3	0	WELL GRADED GRAVEL- w/silt & sand, brown, dry to	
101								moist, sub-rounded to sub-angular fragments, no HCL RXN.	
102									
103									
104									
105									
106									
107									
108									
109									
110	Grab	50	40	10	GM	7.5YR 6/3	0	WELL GRADED GRAVEL- w/silt & sand, light brown, dry,	
111								sub-rounded to sub-angular fragments, no HCL RXN.	
112									
113									
114									
115									
116									
117									
118									
119								WELL GRADED SAND- w/silt & gravel, dark brown, wet,	
120	Grab	20	70	10	SM	7.5YR 3/3	0	sub-rounded to sub-angular fragments, no HCL RXN.	

Project Name: Cooper and Commerce Project No.: 83308 Boring No.: MW-109 Page 4 of 4

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Logged By: NJ. Babb Date: 5-21-07
		GR	SA	FI				Checked By: K. Ross Date: 6-12-07
121								
122								
123								
124								
125								
126								
127								
128	Vis.Obs	******************			*****************	*********	*******	*Encountered water table
129								
130	Grab	80	10	10	GW	7.5YR 5/3	0	WELL GRADED GRAVEL- w/silt & cobble, brown, satur-
131								ated, sub-rounded to sub-angular fragments.
132								
133								
134								
135								
136								
137								
138								
139								
140	Grab	60	30	10	GM	7.5YR 5/3	0	WELL GRADED GRAVEL- w/silt & sand, brown, wet to
141								saturated, sub-rounded to sub-angular fragments.
142								
143								
144								
145								
146								
147								
148								
149								
150	Grab	50	45	5	GW	7.5YR 4/2	0	WELL GRADED COBBLY GRAVEL- w/sand, brown,
151								wet, sub-rounded to sub-angular fragments.
152								
153								
154								
155								
156								
157								
158								
159								
160	Grab	75	10	15	GW	7.5YR 6/3	0	WELL GRADED GRAVEL- w/silt, light brown, dry to
161								moist, sub-rounded to sub-angular fragments.
162								
163								
164								
165	Grab	75	10	15	GW	7.5YR 4/3	0	WELL GRADED COBBLY GRAVEL- w/clay, brown,
166								wet, sub-rounded to sub-angular fragments.
167	*********	******************			******************	**********	*******	*Total Depth of Boring = 167' ft. bgs

HYDRO GEO CHEM, INC.

Well Construction Summary

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation		Boring No.: MW-109
Drilling Company: Layne Christenson Co.	Driller: Perry Hormann	Project No.: 83308
ADWR Well Registration No.: 55-907008		Geologist: NJ. Babb
Location: B/t 775 & 769 Surfside along the south side of the street		

AS-BUILT DIAGRAM

Depth (Ft)   Lithology

0'
Cement
20' ---------------
Volclay/
Bentonite
Grout
99.5' --------------
Bentonite
Pellets
102' --------------
#60 Sand
105.5' --------------
T. O. Screened Interval 110'
#10/20
Pack-
Sand
160'----------------
Sump
165' ---------------
167' Pack-Sand

DRILLING SUMMARY

Total Depth: 167 ft.   Hole Diameter: 10" in.

Drill Rig: AP-1000   Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50' ft. Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0 ft bgs	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 167 ft to 105.5 ft bls
Filter Pack Material: #60 choke/ finer pack-sand	Interval: 105.5 ft to 102 ft bls
Screen Seal Layer: Bentonite medium chips	Interval: 102 ft to 99.5 ft bls
Grout: Volclay/Bentonite Slurry	Interval: 99.5 ft to 20 ft bls
Cement: Portland	Interval: 20 ft to 0 ft bls

Surface Completion: 4 ft x 6 ft concrete-pad with 12-inch diameter traffic vault and metal lid.

*Measuring Point of T. O. C is approx. 0 inches above asphalt-paved surface grade.

CONSTRUCTION TIME LOG

MW-109	Start Date: 5/21/07 Time: 10:15	Finish Date: 5/22/07 Time: 14:00
Drilling: 167 ft / 6.25 hrs.	5/21/07 @ 10:15	5/21/07 @ 16:30
Casing: 165 ft. / 0.5 hrs	5/22/07 @ 7:30	5/22/07 @ 8:00
Filter Pack: 65 ft. / 1.75 hrs	5/22/07 @ 8:00	5/22/07 @ 9:45
Cement & Bentonite Slurry	5/22/07 @ 10:30	5/22/07 @ 11:15
Surface Completion	5/22/07 @ 12:00	5/22/07 @ 14:00

WELL DEVELOPMENT

Date & Time Started: 6/07/07 @ 7:30 Date & Time Completed: 6/07/07 @ 10:12

a = Cased Depth (ft): 165 ft.   d = Casing Diameter (in.): 4 in.

b = Water Depth (ft): 118.37   Date & Time Measured: 6/07/07 @ 7:30

Well Volume = (a - b) x d² x 0.0408 = 30.44 Gallons

Method of Development: 3" in. grundfos submersible pump

Swabbed and Bailed for: 60 minutes

Pumped at: 10 gpm for 48 minutes

Remarks: Gallons Purged: 504 gallons

HYDRO GEO CHEM, INC.

Geologic Boring Log

Sheet 1 of 4

Project Name: Cooper & Commerce WQARF Site; Monitoring Well Installations
Boring No.: MW-110
Drilling Company: Layne Christenson Co.
Driller: Bryan Morris
Project No.: 833300, T4
Site Plan at Boring Location: Gilbert, AZ; SWC of Cooper & Guadalupe Rds., east of SRP-pumping compound and north of R.R. tracks.
Drilling Equipment: AP-1000
Drilling Method: Dual Wall Percussion Hammer
Bit Type: 5 -Tooth Crowd-out Size: 10in. O.D.
Started, Time: 7:15 Date: 2/21/08
Completed, Time: 10:25 Date: 2/21/08
Water Depth, First (Ft): approx. 126' bgs
Water Depth, After 24 Hours (Ft): N/A
Casing Depth (Ft): 165 bgs
Boring Depth (Ft): 167 bgs
Screened Interval (Ft): 110- 160 bgs
Logged By/Date: NJ. Babb on 2/21/08
Checked By/Date: K. Ross on 4/25/08

Samp Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
				GR	SA	FI				
7:15	0	0	Wet	70	15	15	GC	7.5YR 5/3	N	CLAYEY GRAVEL w/SAND - fine to coarse gravel,
	1									rounded to subangular (50mm); contains brown,
	2			*Note sample wet due to heavy rain prior day.						poorly graded, coarse-grained sand, subrounded
	3									to subangular; fines have medium to high plasticity;
	4									wet; no reaction w/HCl; no odor.
	5									
	6									
	7									
	8									
	9									
7:20	10	0	Wet	<5	<15	85	CH	7.5YR 5/6	N	FAT CLAY w/SAND - fine gravel, rounded to sub-
	11									angular (10mm); contains strong brown, poorly
	12									graded, fine-grained sand; fines have medium to
	13									high plasticity, very high dry strength, and medium
	14									toughness; wet; no reaction w/HCl; no odor.
	15									
	16									
	17									
	18									
	19									
7:25	20	0	Dry	0	80	20	SC	5YR 5/4	M	CLAYEY SAND - poorly graded medium-grained
	21									sand, reddish-brown; intermixed w/trace white
	22									caliche (5YR 8/1); dry; moderate reaction w/HCl; no
	23									odor.
	24									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-110 Sheet 2 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/21/08
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
	25									
	26									
	27									
	28									
	29									
7:35	30	1.2	Dry	0	90	10	SP-SM	5YR 5/4	W	POORLY GRADED SAND w/SILT - fine sand and
	31									silt and clay, subrounded, reddish-brown; fines
	32									have medium plasticity; dry; weak reaction w/HCl;
	33									no odor.
	34									
	35									
	36									
	37									
	38									
	39									
7:45	40	0	Dry	0	85	15	SW-SM	5YR 4/4	M	WELL GRADED SAND w/SILT - fine to coarse-
	41									grained sand w/silt and clay, rounded to sub-
	42									angular, reddish-brown; dry; moderate reaction w/
	43									HCl; no odor.
	44									
	45									
	46									
	47									
	48									
	49									
7:50	50	0	Dry	0	85	15	SW-SC	5YR 4/4	M	WELL GRADED SAND w/CLAY - very fine to
	51									coarse sand w/clay, rounded to angular, reddish-
	52									brown; intermixed w/white caliche (5YR 8/1); dry;
	53									moderate reaction w/HCl; no odor.
	54									
	55									
	56									
	57									
	58									
	59									
8:05	60	0	Dry	15	50	35	SC	5YR 4/6	W	CLAYEY SAND w/GRAVEL - fine to very coarse
	61									sand and clay, rounded to angular, yellowish-red;
	62									contains little fine to coarse gravel, subrounded
	63									to sub-angular (2.5"in.); dry; weak reaction w/HCl;
	64									no odor.
	65									
	66									
	67									
	68									
	69									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-110 Sheet 3 of 4

Sample	Depth	PID	Moisture	Estimated %			USCS	Munsell	HCl	Logged By/Date: NJ. Babb on 2/21/08
Time	(Ft)	(ppm)	(Vis Obs)	GR	SA	FI	Symbol	Color	Rxn	Checked By/Date: K. Ross on 4/25/08
8:20	70	0	Dry	15	80	5	SW	5YR 4/3	N	WELL GRADED SAND w/GRAVEL & COBBLES -
	71									50% very fine to coarse sand, rounded to sub-
	72									angular; 50% very fine sand and silt, rounded to
	73									subrounded; reddish-brown; contains little fine to
	74									coarse gravel, rounded to angular (1.5"in.) and
	75									cobbles (3.5"in.); dry; no reaction w/HCl; no odor.
	76									
	77									
	78									
	79									
8:35	80	0	Dry	30	65	5	SW	5 YR 4/4	W	WELL GRADED SAND w/GRAVEL - very fine to
	81									very coarse sand and silt, rounded to angular,
	82									reddish-brown; contains some fine to coarse
	83									gravel, subrounded to angular (30mm); dry, weak
	84									reaction w/HCl; no odor.
	85									
	86									
	87									
	88									
	89									
8:45	90	0	Dry	30	65	5	SW	5 YR 4/6	N	WELL GRADED SAND w/GRAVEL & COBBLES -
	91									very fine to coarse sand and silt, rounded to angu-
	92									lar, yellowish-red; contains some fine to coarse
	93									gravel, rounded to subangular (2"in) and cobbles,
	94									subrounded to angular (3.5"in); dry; no reaction
	95									w/HCl; no odor.
	96									
	97									
	98									
	99									
9:00	100	0	Dry	15	80	5	SW	5 YR 5/4	N	WELL GRADED SAND w/GRAVEL - very fine to
	101									coarse sand and silt, rounded to subangular,
	102									reddish-brown; contains little fine to coarse gravel,
	103									subrounded to subangular (30mm); dry; no reaction
	104									w/HCl; no odor.
	105									
	106									
	107									
	108									
	109									
9:10	110	0	Moist	30	65	5	SW	5 YR 4/4	N	WELL GRADED SAND w/GRAVEL - very fine to
	111									very coarse sand and silt and clay, rounded to sub-
	112									angular, reddish-brown; contains some fine to
	113									coarse gravel, rounded to angular (2.5"in); moist;
	114									no reaction w/HCl; no odor.

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-110 Sheet 4 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/21/08
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
	115									
	116									
	117									
	118									
	119									
9:20	120	0	Wet	30	60	10	SW-SM	5 YR 4/3	N	WELL GRADED SAND w/SILT & GRAVEL -fine to
	121									coarse sand and silt and clay, subrounded to sub
	122									angular, reddish-brown; contains some fine to
	123									coarse gravel, subrounded to subangular (50mm);
	124									wet; no reaction w/HCl; no odor.
	125									
▼▼	126	▼▼▼	▼▼▼▼	▼▼	▼▼	▼▼	▼▼▼▼	▼▼▼▼	▼▼	Appear to have encountered water table.
	127									
	128									
	129									
9:25	130	0	Wet to Saturated	20	60	20	SC	7.5 YR 5/4	N	CLAYEY SAND w/GRAVEL - fine to coarse sand
	131									and clay, rounded to subangular, brown; contains
	132									little fine to coarse gravel, rounded to subangular
	133									(2.5"in); wet to saturated; no reaction w/HCl; no
	134									odor.
	135									
	136									
	137									
	138									
	139									
9:35	140	0	Saturated	70	10	20	GM	7.5 YR 5/4	N	SILTY GRAVEL - mostly fine gravel, subrounded to
	141									angular (30mm); contains little fine to coarse sand
	142									and silt and clay, subrounded to subangular, brown;
	143									fines are 80% silt and 20% clay, non-plastic, low dry
	144									strength, no toughness; saturated; no reaction w/
	145									HCl; no odor.
	146									
	147									
	148									
	149									
9:50	150	0	Saturated	70	20	10	GW-GM	7.5 YR 5/4	N	WELL GRADED GRAVEL & COBBLES w/SILT and
	151									SAND - fine to coarse gravel, subrounded to sub-
	152									angular (30mm) and cobbles, subrounded (4"in);
	153									contains fine to coarse sand and silt, subrounded to
	154									subangular, brown; saturated; no reaction w/HCl;
	155									no odor.
	156									
	157									
	158									
	159									
10:15	160	0	Wet	70	20	10	GW-GM	7.5 YR 5/4	N	WELL GRADED GRAVEL w/SILT & SAND - fine to
	161									coarse gravel, rounded to angular (2.5"in); contains
	162									very fine to coarse sand, rounded to subangular;
	163									fines are 50% silt and 50% clay, non-plastic, low dry
	164									strength, no toughness; brown; saturated; no
	165									reaction w/HCl; no odor.
	166									
10:25	167	*****	********	****	****	****	********	********	****	T.D. of boring; prepare to install well.
	168									
	169									
	170									

HYDRO GEO CHEM, INC.

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation
Boring No.: MW-110
Drilling Company: Layne Christenson Co.
Driller: Bryan Morris
Project No.: 833300, T4
ADWR Well Registration No.: 55-908516
Geologist: NJ. Babb
Location: Gilbert, AZ, SWC of Cooper & Guadalupe Rds. (adjacent to SRP-compound & north of R.R easement).

AS-BUILT DIAGRAM

Depth (Ft)	Lithology
0'	Cement
20'	Grout/ Slurry
101'	Bentonite Pellets
104'	#60 Sand
107'	
T. O. Screened Interval 110'	Screened Interval W/ #10/20 Pack-Sand
160'	Sump
165'	
167'	Pack-Sand

DRILLING SUMMARY

Total Depth: 167 ft.
Hole Diameter: 10" in.
Drill Rig: AP-1000
Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50 ft Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0 bgs)	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 167 ft to 107 ft bgs
Filter Pack Material: #60 choke/ transition pack-sand	Interval: 107 ft to 104 ft bgs
Screen Seal Layer: Bentonite pellets (¼")	Interval: 104 ft to 101 ft bgs
Grout: Volclay/Bentonite Slurry	Interval: 101 ft to 20 ft bgs
Cement: Portland Type II	Interval: 20 ft to 0 ft bgs

Surface Completion: 12" diameter traffic vault w/metal lid surrounded w/in 24" diameter cement.
*Measuring Point of T.O.C: surveyed from the north-side of the T.O.C. that is approx 0.5'ft bgs.

CONSTRUCTION TIME LOG

MW-110	Start Date: 2/21/08 Time: 7:15	Finish Date: 2/21/08 Time: 16:30
Drilling: 167 ft / 3 hrs 10 mins	2/21/08 @ 7:15	2/21/08 @ 10:25
Casing: 165 ft / 0.5 hrs	2/21/08 @ 10:30	2/21/08 @ 11:00
Filter Pack: 66 ft / 1.75 hrs	2/21/08 @ 11:00	2/21/08 @ 12:45
Cement & Bentonite Slurry	2/21/08 @ 13:15	2/21/08 @ 14:15
Surface Completion	2/21/08 @ 15:00	2/21/08 @ 16:30

WELL DEVELOPMENT

Date & Time Started: 2/27/08 @ 7:30
Date & Time Completed: 2/27/08 @ 11:15
a = Cased Depth (ft): 165'
d = Casing Diameter (in.): 4"
b = Water Depth (ft): 116.40'
Date & Time Measured: 2/27/08 @ 7:15
Well Volume = $(a - b) \times d^2 \times 0.0408$ = 32-Gallons
Method of Development: 3" in. grundfos submersible pump
Swabbed and Bailed for: 165 minutes (33-bailers @ 2.5-gals ea. = 85.5-gals)
Pumped at: 12 gpm for 37 minutes
Gallons Bailed: 85.5-gallons
Gallons Purged: 444-gallons
Total Gallons: 529.5-gallons

Remarks:

HYDRO GEO CHEM, INC.

Geologic Boring Log

Sheet 1 of 4

Project Name: Cooper & Commerce WQARF Site, Monitoring Well Installations
Boring No.: MW-111

Drilling Company: Layne Christenson Co.
Driller: Bryan Morris
Project No.: 833300, T4

Site Plan at Boring Location: Gilbert, AZ, Golden Key St. south of Guadalupe, W. adj to 757 Golden Key St. commercial building along the east side of the street.

Drilling Equipment: AP-1000
Drilling Method: Dual Wall Percussion Hammer
Bit Type: 5 -Tooth Crowd-out Size: 10in. O.D.
Started, Time: 10:35 Date: 2/19/08
Completed, Time: 15:30 Date: 2/19/08
Water Depth, First (Ft): approx. 128' bgs
Water Depth, After 24 Hours (Ft): N/A
Casing Depth (Ft): 165 bgs
Boring Depth (Ft): 167 bgs
Screened Interval (Ft): 110-160 bgs
Logged By/Date: NJ. Babb on 2/19/08
Checked By/Date: K. Ross on 4/25/08

Samp Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
				GR	SA	FI				
10:40	0	0	Wet	70	15	15	GC	7.5YR 5/4	M	6"in. Asphalt followed by:
	1									CLAYEY GRAVEL w/SAND - fine to coarse gravel,
	2			*sample wet due to water rinse inside drill-pipe.						fine gravel is sub-rounded to sub-angular, coarse
	3									gravel is subrounded (2.5"in); contains fine to coarse
	4									sand and clay; subrounded to subangular; wet; moderate
	5									reaction w/HCl; no odor.
****	6	*****	********	****	****	****	********	********	****	*Note crew abandoned hole due to large boulder
	7									encountered @ approx. 2' ft bgs interval; relocated
	8									boring 3' ft. to the south.
	9									
11:35	10	0	Dry	<5	75	<30	SC	5YR 5/6	W	CLAYEY SAND - poorly graded fine sand and silt
	11									and clay, yellowish-red; mottled w/white caliche
	12									(5YR 8/1); contains trace fine gravel, subrounded
	13									to subangular (5mm); fines have medium to high plastic-
	14									ity; dry weak reaction w/HCl; no odor.
	15									
	16									
	17									
	18									
	19									
11:50	20	0	Dry	<5	75	<30	SC	5YR 5/6	W	CLAYEY SAND - poorly graded fine sand and silt
	21									and clay, yellowish-red; contains trace fine gravel,
	22									subrounded to subangular (10mm); fines have medium to
	23									high plasticity; dry; weak reaction w/HCl; no odor.
	24									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-111 Sheet 2 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/19/08
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
	25									
	26									
	27									
	28									
	29									
12:05	30	0	Dry	25	70	5	SP	7.5YR 5/6	M	POORLY GRADED SAND w/GRAVEL - very fine
	31									to fine sand and trace silt, rounded, strong brown;
	32									contains little fine gravel (20mm), rounded to sub-
	33									angular; cobbles inter-mixed (3.5"in), flat & elong-
	34									ated; dry; moderate reaction w/HCl; no odor.
	35									
	36									
	37									
	38									
	39									
12:10	40	0	Dry	0	90	10	SP-SM	5YR 4/4	M	POORLY GRADED SAND w/SILT - fine to medium
	41									sand w/few silt and clay, reddish-brown; fines are
	42									nonplastic, low toughness; dry; moderate reaction w/HCl;
	43									no odor.
	44									
	45									
	46									
	47									
	48									
	49									
12:50	50	0	Moist	0	30	70	CL	7.5YR 5/4	S	SANDY LEAN CLAY - medium to coarse sand and
	51									clay, subrounded to angular, brown; fines have
	52									medium dry strength, medium plasticity, medium
	53									toughness; mottled w/white caliche (7.5YR 8/1);
	54									moist; strong reaction w/HCl; no odor.
	55									
	56									
	57									
	58									
	59									
12:55	60	0	Moist	0	20	80	CL	7.5YR 5/4	M	LEAN CLAY w/SAND - fine to medium sand and
	61									clay, subrounded to subangular, brown; fines have
	62									medium dry strength, medium plasticity, medium
	63									toughness; mottled w/white caliche (7.5YR 8/1);
	64									moist; moderate reaction w/HCl; no odor.
	65									
	66									
	67									
	68									
	69									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-111 Sheet 3 of 4

Sample	Depth	PID	Moisture	Estimated %			USCS	Munsell	HCl	Logged By/Date: NJ. Babb on 2/1908
Time	(Ft)	(ppm)	(Vis Obs)	GR	SA	FI	Symbol	Color	Rxn	Checked By/Date: K. Ross on 4/25/08
13:00	70	0	Dry	15	75	10	SW-SC	7.5YR 5/6	S	WELL GRADED SAND w/CLAY & GRAVEL - very
	71									fine to coarse sand and clay; strong brown; contains fine
	72									to large gravel, sub-angular to rounded; maximum particle
	73									size, 20 mm; contains cobbles, subrounded, maximum part-
	74									icle size, 3.5 inches; dry; strong reaction w/HCl; no odor.
	75									
	76									
	77									
	78									
	79									
13:10	80	0	Dry	30	65	5	SP	7.5 YR 6/3	W	POORLY GRADED SAND w/GRAVEL - 50% very fine
	81									rounded sand, 50% coarse subangular sand w/trace silt;
	82									lt. brown; contains fine to large gravel, rounded to angul-
	83									ar, flat & elongated; maximum particle size, 2 inch; dry;
	84									weak reaction w/HCl; no odor.
	85									
	86									
	87									
	88									
	89									
13:15	90	0	Dry	50	<50	<5	GW	7.5YR 5/6	S	WELL GRADED GRAVEL w/SILT & SAND - fine to
	91									coarse gravel, rounded to subangular (20mm) and
	92									cobbles, subrounded (4 in); contains fine to coarse
	93									sand and clay, subrounded to subangular, strong
	94									brown; dry; strong reaction w/HCl; no odor.
	95									
	96									
	97									
	98									
	99									
13:50	100	0	Dry	25	70	5	SW	7.5YR 5/4	N	WELL GRADED SAND w/GRAVEL - very fine to very
	101									coarse sand and silt, rounded to subangular, brown; con-
	102									tains some fine to coarse gravel, rounded to subangular;
	103									maximum particle size, 20mm; contains cobbles, rounded
	104									to subrounded; maximum particle size, 4 inches; dry; no
	105									reaction w/HCl; no odor.
	106									
	107									
	108									
	109									
14:10	110	0	Dry	25	70	5	SP	7.5YR 5/4	N	POORLY GRADED SAND w/GRAVEL - 50% fine round-
	111									ed sand, 50% coarse subangular sand w/trace clay,
	112									brown; contains fine to coarse gravel (20mm); dry; no
	113									reaction w/HCl; no odor.
	114									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-111 Sheet 4 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/1908
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
	115									
	116									
	117									
	118									
	119									
14:20	120	0	Moist	25	65	10	SP-SM	7.5YR 5/4	N	POORLY GRADED SAND w/SILT & GRAVEL - coarse
	121									sand and silt, subrounded to subangular, brown; contains
	122									fine to coarse gravel, rounded to angular; maximum part-
	123									icle size, 2.5 inches; moist, no reaction w/HCl; no odor.
	124									
	125									
	126									
	127									
▼▼	128	▼▼▼	▼▼▼▼	▼▼	▼▼	▼▼	▼▼▼▼	▼▼▼▼	▼▼	Appear to have encountered water table.
	129									
14:25	130	0	Wet	30	40	30	SM	7.5YR 4/4	N	SILTY SAND w/GRAVEL - coarse sand and silt, sub-
	131									rounded to subangular, brown; contains fine to coarse
	132									gravel, rounded to subangular (20mm); contains cobbles,
	133									rounded to subrounded (4.5 inch); wet; no reaction
	134									w/HCl; no odor.
	135									
	136									
	137									
	138									
	139									
14:40	140		Saturated	****	****	****	*******	*******	****	Note grab samples are completely saturated; was not
	141									able to obtain sample at this interval.
	142									
	143									
	144									
	145									
	146									
	147									
	148									
	149									
14:55	150		Saturated	****	****	****	*******	*******	****	Note grab samples are completely saturated; was not
	151									able to obtain sample at this interval.
	152									
	153									
	154									
	155									
	156									
	157									
	158									
	159									
15:05	160		Saturated	****	****	****	*******	*******	****	Note grab samples are completely saturated; was not
	161									able to obtain sample at this interval.
	162									
	163									
	164									
	165									
	166									
15:15	167	*****	********	****	****	****	********	********	****	T.D. of boring; prepare to install well.
	168									
	169									
	170									

HYDRO GEO CHEM, INC.

Well Construction Summary

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation   Boring No.: MW-111
Drilling Company: Layne Christenson Co.   Driller: Bryan Morris   Project No.: 833300, T4
ADWR Well Registration No.: 55-908517   Geologist: NJ. Babb
Location: Gilbert, AZ, Golden Key St. south of Guadalupe Rd., on east side of street and west of 757 Golden Key.

AS-BUILT DIAGRAM

Depth (Ft)	Lithology
0'	Cement
20'	Grout/ Slurry
101'	Bentonite Pellets
103.6'	#60 Sand
107'	
T. O. Screened Interval 110'	Screened Interval W/ #10/20 Pack-Sand
160'	Sump
165'	
167'	Pack-Sand

DRILLING SUMMARY

Total Depth: 167 ft.   Hole Diameter: 10" in.
Drill Rig: AP-1000   Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50 ft Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0ft bgs)	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 167 ft to 107 ft bgs
Filter Pack Material: #60 choke/ finer pack-sand	Interval: 107 ft to 103.6 ft bgs
Screen Seal Layer: Bentonite pellets (¼")	Interval: 103.6 ft to 101 ft bgs
Grout: Volclay/Bentonite Slurry	Interval: 101 ft to 20 ft bgs
Cement: Portland Type II	Interval: 20 ft to 0 ft bgs

Surface Completion: 4 ft x 6 ft concrete-pad with 12-inch diameter traffic vault and metal lid.
*Measuring Point of T.O.C: surveyed from the north-side of the T.O.C. that is approx 0.5'ft bgs.

CONSTRUCTION TIME LOG

MW-111	Start Date: 2/19/08 Time: 10:40	Finish Date: 2/20/08 Time: 13:30
Drilling: 167 ft / 7.25 hrs.	2/19/08 @ 10:40	2/19/08 @ 15:15
Casing: 165 ft / 0.5 hrs	2/19/08 @ 15:30	2/19/08 @ 16:00
Filter Pack: 66 ft / 1.75 hrs	2/19/08 @ 16:30-17:00	2/20/08 @ 7:30-8:30
Cement & Bentonite Slurry	2/20/08 @ 9:00	2/20/08 @ 10:30
Surface Completion	2/20/08 @ 12:00	2/20/08 @ 13:30

WELL DEVELOPMENT

Date & Time Started: 2/26/08 @ 12:50   Date & Time Completed: 2/26/08 @ 15:47
a = Cased Depth (ft): 165'   d = Casing Diameter (in.): 4"
b = Water Depth (ft): 117.65   Date & Time Measured: 2/26/08 @ 12:45
Well Volume = (a - b) x d² x 0.0408 = 30.9-Gallons
Method of Development: 3" in. grundfos submersible pump
Swabbed and Bailed for: 120 minutes (23-bailers @ 2.5-gals ea. = 57.5-gals)
Pumped at:12 gpm for 40 minutes
Gallons Bailed: 57.5-gallons
Gallons Purged: 480-gallons
Total Gallons: 537.5-gallons

Remarks:

HYDRO GEO CHEM, INC.

Geologic Boring Log

Sheet 1 of 4

Project Name: Cooper & Commerce WQARF Site, Monitoring Well Installations

Boring No.: MW-112

Drilling Company: Layne Christenson Co.

Driller: Bryan Morris

Project No.: 833300, T4

Site Plan at Boring Location: Gilbert, AZ, Neely St. south of Guadalupe, just north of railroad tracks.

Drilling Equipment: AP-1000

Drilling Method: Dual Wall Percussion Hammer

Bit Type: 5 -Tooth Crowd-out

Size: 10in. O.D.

Started, Time: 7:50

Date: 2/18/08

Completed, Time: 11:40

Date: 2/18/08

Water Depth, First (Ft): approx. 132' bgs

Water Depth, After 24 Hours (Ft): N/A

Casing Depth (Ft): 165 bgs

Boring Depth (Ft): 166 bgs

Screened Interval (Ft): 110-160 bgs

Logged By/Date: NJ. Babb on 2/18/08

Checked By/Date: K. Ross on 4/25/08

Samp Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
				GR	SA	FI				
7:50	0	0	Dry	<5	95	<5	SW	5YR 4/4	W	WELL GRADED SAND - fine to very fine sand
	1									and silt, rounded to subrounded, reddish-brown;
	2									contains trace fine gravel, round to subangular
	3									(5mm); dry; weak reaction w/HCl; no odor.
	4									
	5									
	6									
	7									
	8									
	9									
8:00	10	0	Dry	5	85	10	SW-SC	5YR 5/6	W	WELL GRADED SAND w/CLAY - very fine to
	11									medium sand w/few silt and clay, yellowish-red;
	12									note clay fragments in sample are jagged and ang-
	13									ular, dark gray (1 Gley 4); contains trace fine to
	14									coarse gravel, subrounded to subangular, maxi-
	15									mum particle size 20mm; dry; weak reaction w/HCl;
	16									no odor.
	17									
	18									
	19									
8:20	20	0	Dry	5	85	10	SW-SC	5YR 5/4	M	WELL GRADED SAND w/CLAY - very fine to
	21									medium sand w/few silt and clay, reddish-brown;
	22									contains trace fine gravel, subrounded to sub-
	23									angular, maximum particle size 20mm; dry; moder-
	24									ate reaction w/HCl; no odor.

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-112 Sheet 2 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/18/08
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
	25									
	26									
	27									
	28									
	29									
8:30	30	0	Dry	<5	80	<20	SM	7.5YR 6/4	S	SILTY SAND - very fine to fine sand, rounded; lt.
	31									brown; contains trace gravel, sub-rounded to sub-
	32									angular; maximum particle size, 10 mm; silt fines
	33									have low dry strength, medium plasticity, no dila-
	34									tancy, medium toughness; dry; strong reaction w/
	35									HCl; no odor.
	36									
	37									
	38									
	39									
8:50	40	0	Dry	<5	75	<25	SC	5YR 4/6	W	CLAYEY SAND - fine to very fine sand and clay,
	41									yellowish-brown; contains trace fine gravel, sub-
	42									rounded to subangular, maximum particle size 10mm;
	43									fines have medium plasticity; dry; weak reaction w/
	44									HCl; no odor.
	45									
	46									
	47									
	48									
	49									
9:00	50	0	Moist	<5	70	<30	SC	5YR 5/4	W	CLAYEY SAND - fine to medium sand and clay,
	51									reddish-brown; contains trace fine gravel, sub-
	52									rounded to subangular, maximum particle size 10mm;
	53									fines have medium plasticity; moist; weak reaction
	54									w/HCl; no odor.
	55									
	56									
	57									
	58									
	59									
9:05	60	0	Moist	<5	70	<30	SC	5YR 5/4	W	CLAYEY SAND - fine to medium sand and clay,
	61									reddish-brown; contains trace nodules of white
	62									caliche (5YR 8/1); contains trace fine gravel, sub-
	63									rounded to subangular, maximum particle size 10mm;
	64									fines have medium plasticity; moist; weak reaction
	65									w/HCl; no odor.
	66									
	67									
	68									
	69									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-112 Sheet 3 of 4

Sample Time	Depth (Ft)	PID (ppm)	Moisture (Vis Obs)	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Logged By/Date: NJ. Babb on 2/18/08
				GR	SA	FI				Checked By/Date: K. Ross on 4/25/08
9:15	70	0	Moist	0	10	90	CH	5YR 4/6	W	FAT CLAY - contains very fine sand, rounded, yellowish-red; intermixed w/black mineral fragments containing quartz; fines have high dry strength, high plasticity, high toughness; moist; weak reaction w/ HCl.
	71									
	72									
	73									
	74									
	75									
	76									
	77									
	78									
	79									
9:25	80	0	Dry	25	70	5	SW	5YR 4/6	N	WELL GRADED SAND w/GRAVEL - very fine to coarse sand and silt, rounded to subangular, yellowish-red; contains little fine to coarse gravel, subrounded to subangular (30mm); contains cobbles, rounded to subangular (3.5 inches); dry; no reaction w/HCl; no odor.
	81									
	82									
	83									
	84									
	85									
	86									
	87									
	88									
	89									
9:55	90	0	Dry	50	<50	<5	GW	7.5YR 6/3	N	WELL GRADED GRAVEL w/SAND - fine to coarse sand and trace silt, subrounded to subangular, lt. brown; contains fine to coarse gravel, subrounded to subangular (30mm); contains cobbles, rounded to subangular (4 inches); dry; no reaction w/HCl; no odor.
	91									
	92									
	93									
	94									
	95									
	96									
	97									
	98									
	99									
9:55	100	0	Dry	30	60	10	SW-SM	7.5YR 6/3	N	WELL GRADED SAND w/SILT & GRAVEL - very fine to medium sand and silt, rounded to subangular, lt. brown; contains fine to coarse gravel, rounded to angular (50 mm); dry; no reaction w/HCl; no odor.
	101									
	102									
	103									
	104									
	105									
	106									
	107									
	108									
	109									
10:10	110	0	Dry	50	<50	<5	GW	7.5YR 6/3	N	WELL GRADED GRAVEL w/SAND - very fine to coarse sand and silt, rounded to subangular, brown; contains fine to coarse gravel, rounded to angular, maximum particle size 50mm; dry; no reaction w/HCl; no odor.
	111									
	112									
	113									
	114									

Project Name: Cooper & Commerce Project No.: 833300, T4 Boring No.: MW-112 Sheet 4 of 4

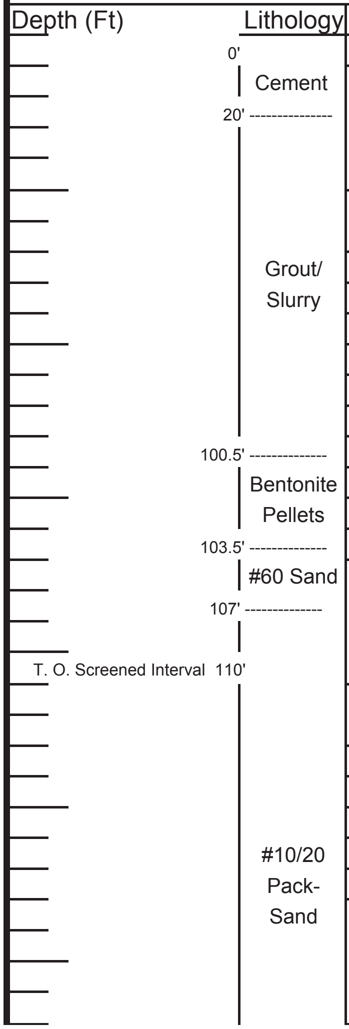
Sample	Depth	PID	Moisture	Estimated %			USCS	Munsell	HCl	Logged By/Date: NJ. Babb on 2/18/08
Time	(Ft)	(ppm)	(Vis Obs)	GR	SA	FI	Symbol	Color	Rxn	Checked By/Date: K. Ross on 4/25/08
	115									
	116									
	117									
	118									
	119									
10:25	120	0	Dry	25	<70	<5	SW	7.5YR 5/3	N	WELL GRADED SAND w/GRAVEL - very fine to
	121									coarse sand and silt, rounded to subangular, brown;
	122									contains little fine to coarse gravel, rounded to an-
	123									gular (30mm); contains cobbles, rounded to sub-
	124									angular (3.5 inches); dry; no reaction w/HCl; no
	125									odor.
	126									
	127									
	128									
	129									
10:35	130	0	Moist	50	<50	<5	GW	7.5YR 4/4	N	WELL GRADED GRAVEL w/SAND - very fine to
	131		to Wet							coarse sand and silt, rounded to subangular, brown;
▼▼	132	▼▼▼	▼▼▼▼	▼▼	▼▼	▼▼	▼▼▼▼	▼▼▼▼	▼▼	contains fine to coarse gravel, rounded to angular,
	133			Appear to have encountered water table.						maximum particle size 30mm; contains cobbles,
	134									rounded to subangular (4.5 inches); moist to wet; no
	135									reaction w/HCl; no odor.
	136									
	137									
	138									
	139									
10:50	140	0	Wet to	50	<50	<5	GW	7.5YR 4/3	N	WELL GRADED GRAVEL w/SAND - very fine to
	141		Saturated							coarse sand and silt, rounded to subangular, brown;
	142									contains fine to coarse gravel, rounded to sub-
	143									angular (30mm); contains cobbles, rounded to sub-
	144									rounded (4 inches); wet to saturated; no reaction w/
	145									HCl; no odor.
	146									
	147									
	148									
	149									
11:15	150	0	Saturated	60	<40	<5	GW	7.5YR 4/3	N	WELL GRADED GRAVEL w/SAND - approximately
	151									90% poorly graded coarse sand w/10% fine sand
	152									and silt, brown; contains fine to coarse gravel,
	153									rounded to angular (50mm); saturated; no reaction
	154									w/HCl; no odor.
	155									
	156									
	157									
	158									
	159									
11:30	160	0	Saturated	70	<30	<5	GW	7.5YR 4/3	N	WELL GRADED GRAVEL w/SAND - very fine to
	161									coarse sand and silt, rounded to subangular, brown;
	162									contains fine to coarse gravel, rounded to sub-
	163									angular (40mm); saturated; no reaction w/HCl; no
	164									odor.
	165									
11:40	166	*****	********	****	****	****	********	********	****	T.D. of boring; prepare to install well.
	167									
	168									
	169									
	170									

HYDRO GEO CHEM, INC.

Well Construction Summary

Project Name: Cooper & Commerce WQARF Site ERA Evaluation: Well Installation		Boring No.: MW-112
Drilling Company: Layne Christenson Co.	Driller: Bryan Morris	Project No.: 833300, T4
ADWR Well Registration No.: 55-908518		Geologist: NJ. Babb
Location: Gilbert, AZ, Neely St. south of Guadalupe just north of railroad tracks, east of sidewalk.		

AS-BUILT DIAGRAM



DRILLING SUMMARY

Total Depth: 166 ft.	Hole Diameter: 10" in.
Drill Rig: AP-1000	Bit Type: Dual wall percussion hammer w/5-point bit

WELL DATA

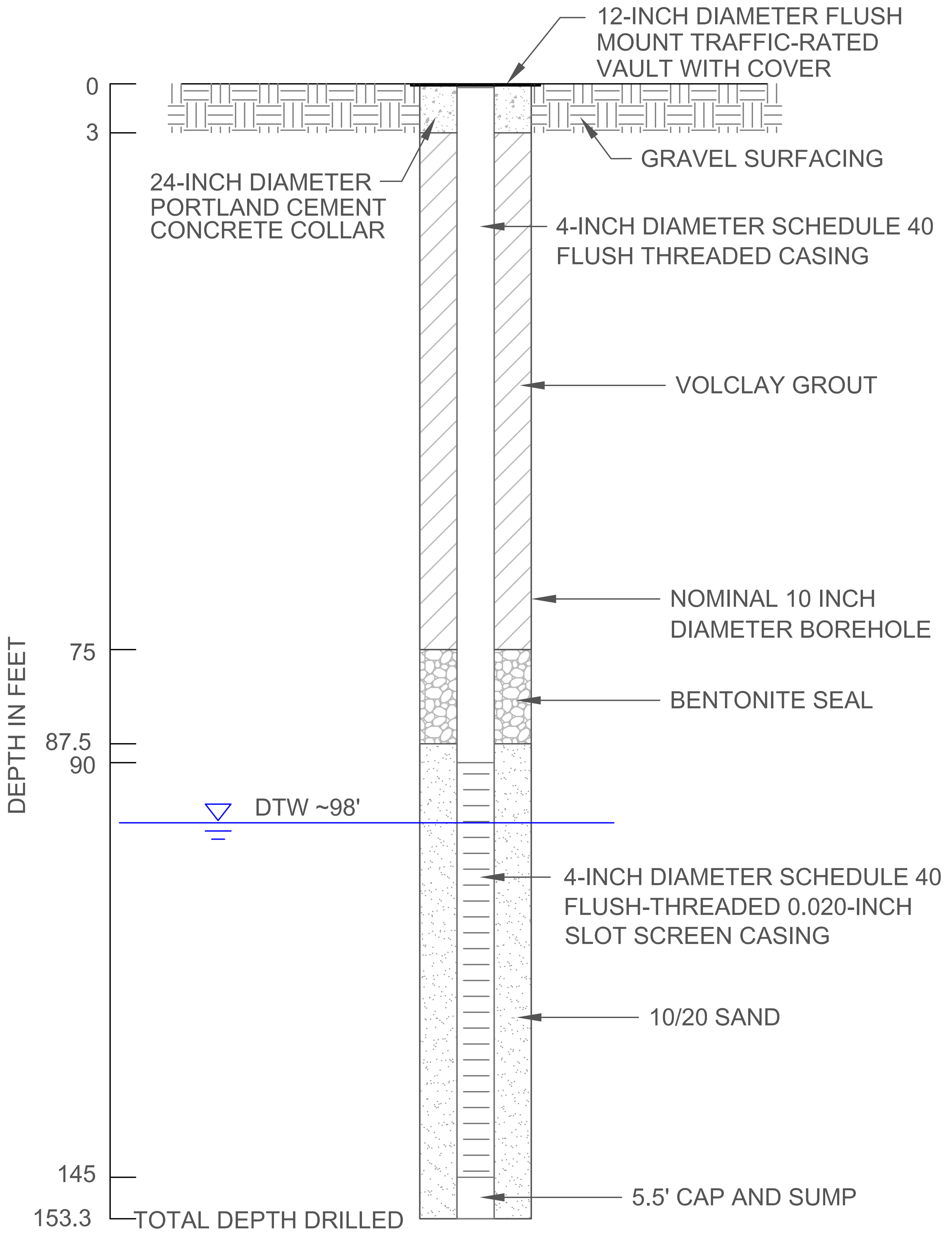
Well Casing	Depth Interval (Ft) Screen	Diameter, Material, Screen Slot Size
5 ft solid sump casing (165-160)	50' ft. Interval	4" in. Sch 40 PVC, 0.020"
4 in SCH 40 PVC(110 to 0 ft bgs)	160 ft to 110 ft bgs	

Filter Pack Material: #10/20 pack-sand	Interval: 166 ft to 107 ft bgs
Filter Pack Material: #60 choke/ finer pack-sand	Interval: 107 ft to 103.5 ft bgs
Screen Seal Layer: Bentonite Pellets (¼")	Interval: 103.5 ft to 100.5 ft bgs
Grout: Volclay/Bentonite Slurry	Interval: 100.5 ft to 20 ft bgs
Cement: Portland Type II	Interval: 20 ft to 0 ft bgs
Surface Completion: 12" diameter traffic vault w/metal lid surrounded w/in 24" diameter cement.	
*Measuring Point of T. O. C: surveyed from the north-side of the T.O.C. that is approx 0.5'ft bgs.	

CONSTRUCTION TIME LOG

MW-112	Start Date: 2/18/08 Time: 7:50	Finish Date: 2/20/08 Time: 14:30
Drilling: 166 ft / 3 hrs 50 mins	2/18/08 @ 7:50	2/18/08 @ 11:40
Casing: 165 ft. / 0.5 hrs	2/18/08 @ 12:45	2/18/08 @ 13:15
Filter Pack: 65.5 ft. / 1.5 hrs	2/18/08 @ 13:15	2/18/08 @ 14:45
Cement & Bentonite Slurry	2/19/08 @ 7:00	2/19/08 @ 9:00
Surface Completion	2/20/08 @ 13:45	2/20/08 @ 14:30

WELL DEVELOPMENT



NOT TO SCALE

ADWR# 55-913316

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MW-113
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
CLJ	**8/9/11**	**SCJ**	**8/9/11**	2010002012B	**1**

Project: Cooper & Commerce Boring: **MW-113** Pg. 1 of 5

Drilling Co: **Yellow Jacket - T.Phillips**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/6/11**
Location: **In gravel easement in front of 905 W. Encinas St.**
Sampler Type: **Grab**
Date Completed: **6/23/11**
Desc. of Meas Pt:
Logged by: **S. Jacquemin**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
				0		Silt - strong brown (7.5YR 4/6); very fine grained sand; some clay, very soft, slightly plastic; no reaction to HCl	ML		10	90	M
				10		strong brown (7.5YR 5/6); decreased sand fraction; strong reaction to HCl			5	95	M
				15		brown (7.5YR 5/4); decreased sand fraction; clumps of silt and clay mix, non-plastic; strong reaction to HCl			2	98	D
				20		light brown (7.5YR 6/4); increased sand fraction; trace clay; very strong reaction to HCl			5	95	D
				25		brown (7.5YR 5/4); decreased sand fraction, increased clay, very soft, cohesive, slightly plactic; strong reaction to HCl			2	98	D
				30		Silty Clay - light brown (7.5YR 6/4); trace very fine grained sand; very soft, cohesive, slightly plastic; slight to moderate carbonate cementation; strong reaction to HCl	CL-ML		3	97	D
				35							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-113

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		1a

Project: Cooper & Commerce　Boring: **MW-113**　Pg. 2 of 5

Drilling Co: **Yellow Jacket - T.Phillips**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/6/11**
Location: **In gravel easement in front of 905 W. Encinas St.**
Sampler Type: **Grab**
Date Completed: **6/23/11**
Desc. of Meas Pt:
Logged by: **S. Jacquemin**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						brown (7.5YR 5/4); no sand; strong reaction to HCl				100	D
				40		Silt - brown (7.5YR 5/4); soft texture; loose; strong reation to HCl	ML			100	D
				45		brown (7.5YR 6/3)				100	M
				50		brown (7.5YR 5/4); moderate reaction to HCl				100	M
				55		with some clay, very soft, slightly cohesive, non-plastic; no reaction to HCl				100	M
				60		moderate reaction to HCl				100	M
				65		brown (7.5YR 5/3); strong reaction to HCl				100	M
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-113

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		1b

Project: Cooper & Commerce
Boring: **MW-113**
Pg. 3 of 5

Drilling Co: **Yellow Jacket - T.Phillips**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/6/11**

Location: **In gravel easement in front of 905 W. Encinas St.**
Sampler Type: **Grab**
Date Completed: **6/23/11**

Desc. of Meas Pt: ____
Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl): ____
Meas. Pt. Elev: ____
Reviewed by: ____

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
						brown (7.5YR 5/3); strong reaction to HCl*(continued)*				100	M
				75						100	M
				80		Silt with Sand - brown (7.56YR 5/4); fine grained sand; trace clay, soft and gritty texture; very strong reaction to HCl			15	85	M
				85		decreased sand fraction			10	90	M
						Poorly Graded Sand with Silt and Gravel - brown (75YR 5/4); very fine to coarse grained sand; fine sized angular to subangular gravel; trace silt and clay	SP-SM	30	60	10	
				90		Poorly Graded Gravel - light brown (7.5YR 6/3); fine angular to subangular; with sand; trace fines	GP	85	10	5	D
				95		brown (7.5YR 5/4); angular gravel; cobbles present; decreased sand and fines		90	<10	<5	D
				100		subangular to rounded gravel; increased sand fraction		85	<15	<5	W
				105							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-113
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		1c

Project: Cooper & Commerce Boring: **MW-113** Pg. 4 of 5

Drilling Co: **Yellow Jacket - T.Phillips** Drilling Method: **Hollow Stem Auger** Date Started: **6/6/11**

Location: **In gravel easement in front of 905 W. Encinas St.** Sampler Type: **Grab** Date Completed: **6/23/11**

Desc. of Meas Pt: Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl): Meas. Pt. Elev: Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					⁘	Poorly Graded Sand with Gravel - dark brown (7.5YR 3/3); subangular to rounded; no reaction to HCl	SP	25	65	10	W
					●	Poorly Graded Gravel - angular to subangular gravel; trace sand; no reaction to HCl	GP	60	30	10	W
				110	●			80	15	5	W
				115	⁘	Poorly Graded Sand with Gravel - subangular to rounded gravel with sand	SP	15	80	5	W
				120	●	Silty Gravel with Sand - dark brown (7.5YR 3/4); small subangular to rounded gravel; with fines	GM	50	25	25	W
				125	⁘	Poorly Graded Sand with Gravel - brown (7.5YR 4/4); small rounded gravel; some fines	SP	15	75	10	W
				130	●	Poorly Graded Gravel with Sand - brown (7.5YR 4/4); subangular to rounded gravel; trace fines	GP	50	40	10	W
				135	●	Silty Gravel with Sand - brown (10YR 4/3); fine subangular to rounded gravel; with sand; some fines	GM	55	30	15	W
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-113

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		1d

Project: Cooper & Commerce
Boring: **MW-113**
Pg. 5 of 5

Drilling Co: **Yellow Jacket - T.Phillips**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/6/11**

Location: **In gravel easement in front of 905 W. Encinas St.**
Sampler Type: **Grab**
Date Completed: **6/23/11**

Desc. of Meas Pt:
Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

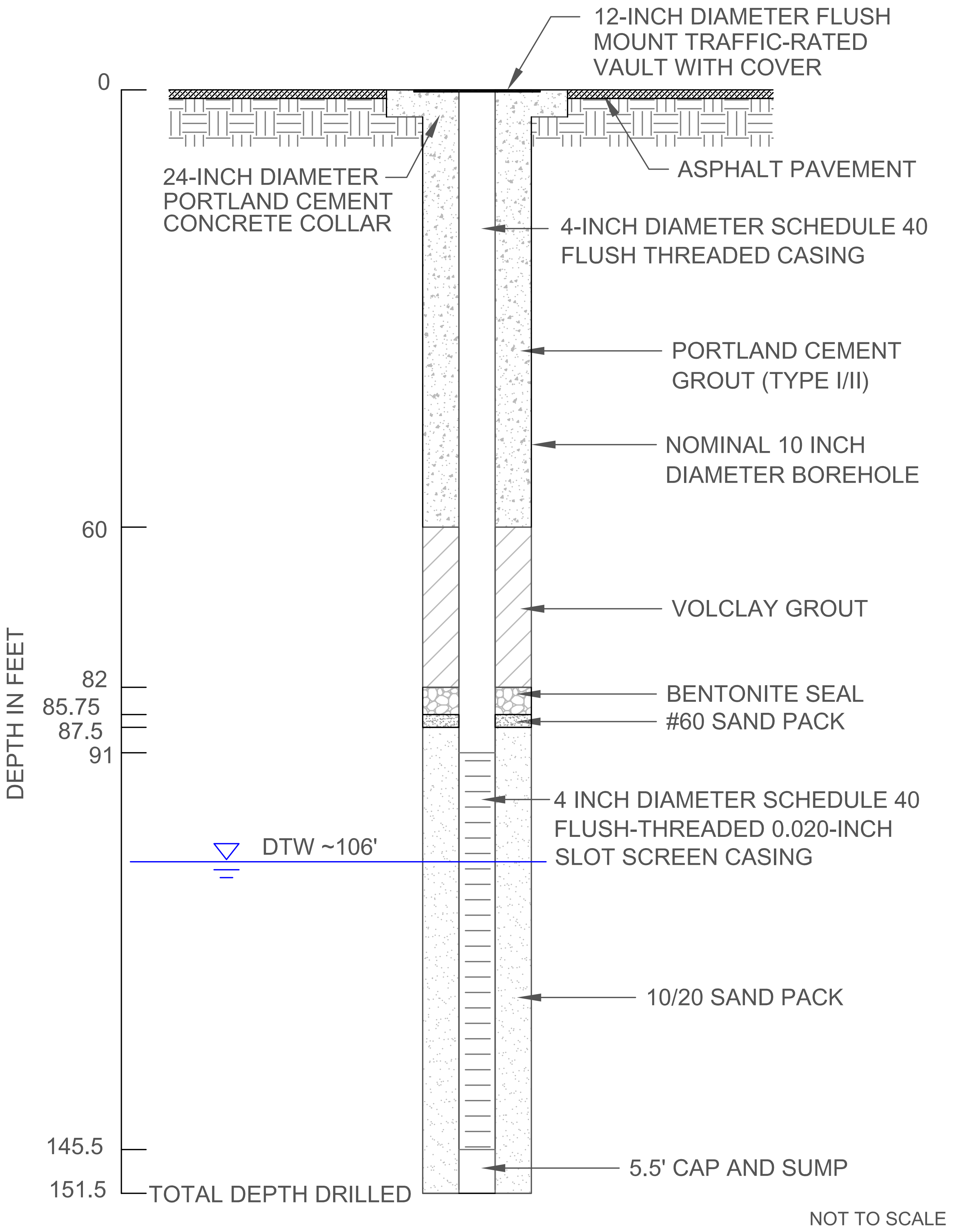
Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
				145		Poorly Graded Gravel with Silt and Sand - small rounded with some subangular gravel; with sand; trace fines	GP-GM	65	30	5	W
				150		Poorly Graded Gravel with Sand - small to large subangular to rounded gravel; cobbles present; with sand; trace fines	GP	65	30	<5	W
						Total depth 152.5 ft bls					

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-113

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		1e



ADWR# 55-913317

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MW-114
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
CLJ	8/9/11	SCJ	8/9/11	2010002013B	2

Project: Cooper & Commerce
Boring: **MW-114**
Pg. 1 of 5

Drilling Co: **Yellow Jacket - T.Hernandez**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/27/11**
Location: **On Scott Ave. between Dodge St. & Golden Key St.**
Sampler Type: **Grab**
Date Completed: **7/5/11**
Desc. of Meas Pt:
Logged by: **S. Jacquemin**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Asphalt (4-inch)					
						ABC fill material (8-inch)					
						Silt with Sand - brown (7.5YR 4/4); some clay, slightly cohesive, low plasticity; moderate reaction to HCl					
				5			ML		45	55	M
				10		decreased fines; trace gravel		5	45	50	M
				15				5	45	50	M
				20							
				25							
				30							
				35							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-114

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	**3/7/14**		**2a**

Project: Cooper & Commerce
Boring: **MW-114**
Pg. 2 of 5

Drilling Co: **Yellow Jacket - T.Hernandez**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/27/11**

Location: **On Scott Ave. between Dodge St. & Golden Key St.**
Sampler Type: **Grab**
Date Completed: **7/5/11**

Desc. of Meas Pt:
Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						decreased fines; trace gravel *(continued)*					
						Lean Clay with Sand - dark brown (7.5YR3/3); cohesive, low to moderate plasticity; moderate reaction to HCl					
				40			CL		35	65	M
				45							
				50		trace gravel		5	35	60	M
				55		no gravel			35	65	M
				60		decreased sand, trace gravel; moderate reaction to HCl		5	25	70	M
				65							
				70							

HYDRO GEO CHEM, INC.

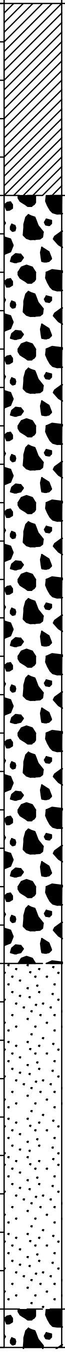
Lithologic Log of Soil Boring MW-114

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		**2b**

Project: Cooper & Commerce Boring: **MW-114** Pg. 3 of 5

Drilling Co: **Yellow Jacket - T.Hernandez** Drilling Method: **Hollow Stem Auger** Date Started: **6/27/11**
Location: **On Scott Ave. between Dodge St. & Golden Key St.** Sampler Type: **Grab** Date Completed: **7/5/11**
Desc. of Meas Pt: Logged by: **S. Jacquemin**
Land Surf. Elev (ft amsl): Meas. Pt. Elev: Reviewed by:



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					brown (7.5YR 4/4); increased sand; some clay, cohesive, moderate plasticity; moderate reaction to HCl		<10	35	55	M
				75	Poorly Graded Gravel with Sand - subangular to rounded gravel; no reaction to HCl	GP	50	40	10	
				80						
				85			55	40	5	M
				90			50	45	5	M
				95	Poorly Graded Sand with Gravel - dark brown (7.5YR 3/3); small subangular to rounded gravel	SP	45	50	5	M
				100	brown (7.5YR 4/4); increase in sand grain size					
				105	Poorly Graded Gravel with Sand - dark brown (7.5YR 3/3); subangular to rounded gravel					

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-114
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		2c

Project: Cooper & Commerce
Boring: **MW-114**
Pg. 4 of 5

Drilling Co: **Yellow Jacket - T.Hernandez**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/27/11**

Location: **On Scott Ave. between Dodge St. & Golden Key St.**
Sampler Type: **Grab**
Date Completed: **7/5/11**

Desc. of Meas Pt:
Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Poorly Graded Gravel with Sand - dark brown (7.5YR 3/3); subangular to rounded gravel *(continued)*	GP	55	40	5	M
				110		increased gravel; decreased sand fraction		70	25	5	M
				115		increased small subangular to rounded gravel; decreased sand fraction		50	40	10	M
				120				60	35	5	W
				125		increased gravel size		60	35	5	M
				130				60	30	10	W
				135							
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-114
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	**3/7/14**		**2d**

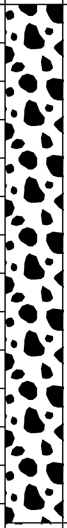
Project: Cooper & Commerce
Boring: **MW-114**
Pg. 5 of 5

Drilling Co: **Yellow Jacket - T.Hernandez**
Drilling Method: **Hollow Stem Auger**
Date Started: **6/27/11**

Location: **On Scott Ave. between Dodge St. & Golden Key St.**
Sampler Type: **Grab**
Date Completed: **7/5/11**

Desc. of Meas Pt:
Logged by: **S. Jacquemin**

Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by:

Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
				145 150		some cobbles present					

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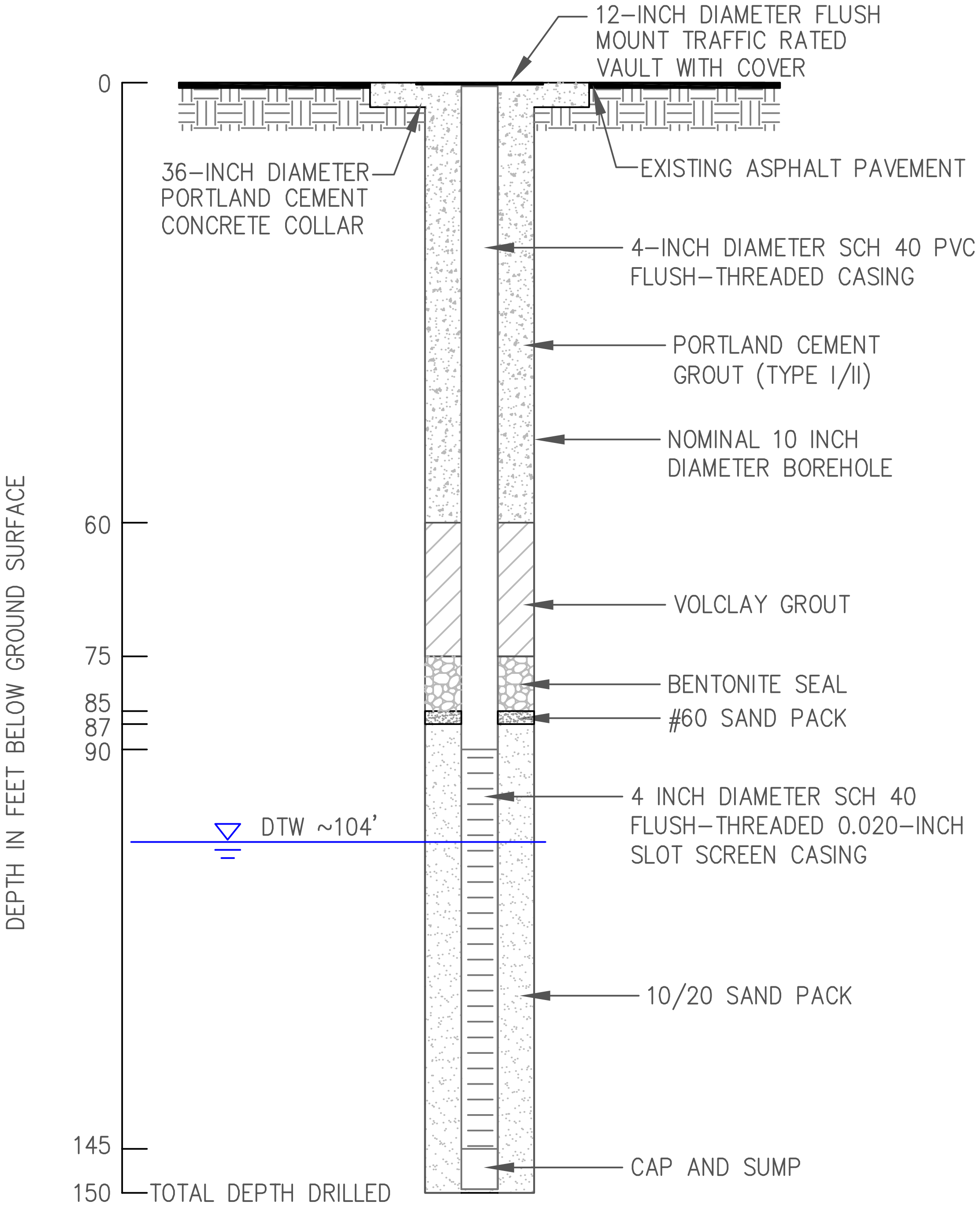
Lithologic Log of Soil Boring MW-114

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		BDV	3/7/14		2e



NOT TO SCALE

HYDRO GEO CHEM, INC.

MW-115
ADWR WELL #55-222549
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	2/28/14	JAA	2/28/14	2010002075A	

H:\2010002 Cooper&Commerce\RI, GW Mon 2010002.50_.60\GW Monitor Well Installations\2013\MW-115 thru MW-119\Figures\Final Figures\MW115 2010002075A.pdf

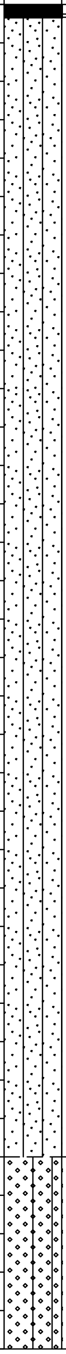
Project: Cooper & Commerce　Boring: **MW-115**　Pg. 1 of 5

Drilling Co: **National Exploration**　Drilling Method: **Air Rotary (Speedstar 50K)**　Date Started: **9/3/13**

Location: **Northwest corner of W. Vaughn Ave. & N. Taigo Dr.**　Sampler Type: **Grab**　Date Completed: **9/4/13**

Desc. of Meas Pt:　Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1224.0**　Meas. Pt. Elev:　Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						BOREHOLE DIAMETER - 10 inches					
						Asphalt	SM		70	30	D
						Silty Sand - Reddish brown (5YR4/4); very fine to medium grained sand; trace coarse sand; some silt and clay					
				5							
				10		Decreased fines	SM		75	25	D
				15							
				20		Brown (7.5YR5/4); increased fines; moderately cemented nodules throughout	SM		70	30	D
				25							
				30		Well-Graded Sand with Silt - Brown (7.5YR5/4); - Very fine to coarse grained sand; some fine to coarse subrounded to subangular gravels; trace silt; no clay	SW-SM	20	70	10	D
				35							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-115

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		3a

Project: Cooper & Commerce Boring: **MW-115** Pg. 2 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/3/13**
Location: **Northwest corner of W. Vaughn Ave. & N. Taigo Dr.**
Sampler Type: **Grab**
Date Completed: **9/4/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1224.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Sand with Silt - Brown (7.5YR5/4); - Very fine to coarse grained sand; some fine to coarse subrounded to subangular gravels; trace silt; no clay *(continued)*					
				40		Sandy Lean Clay - Light brown (7.5YR6/3); very fine to medium grained sand and silt; low plasticity; moderately cemented nodules	CL		30	70	M
				45							
				50		Decreased sand and increased silt; low to no plasticity; no cementation	CL		25	75	M
				55							
				60		Well-Graded Sand with Silt - Light brown (7.5YR6/3); fine to coarse grained sand; trace fine subangular gravel; trace silt and very fine grained sand	SW-SM	10	80	10	M
				65							
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine subangular and subrounded gravel; with some coarse subangular and subrounded gravel; some coarse grained sand	GW	80	20		D
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-115

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		3b

Project: Cooper & Commerce
Boring: **MW-115**
Pg. 3 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/3/13**

Location: **Northwest corner of W. Vaughn Ave. & N. Taigo Dr.**
Sampler Type: **Grab**
Date Completed: **9/4/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1224.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine subangular and subrounded gravel; with some coarse subangular and subrounded gravel; some coarse grained sand *(continued)*					
				75							
				80		Increased coarse gravel (50-50); trace coarse sand	GW	90	10		D
				85							
				90		Decreased coarse gravel; increased coarse sand	GW	75	25		D
				95							
				100		Increased density; slow drilling	GW	80	20		M
						Groundwater encountered					
				105							

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Lithologic Log of Soil Boring MW-115
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		**3c**

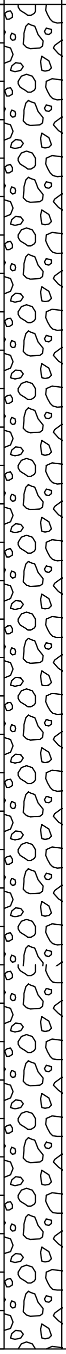
Project: Cooper & Commerce Boring: **MW-115** Pg. 4 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **9/3/13**

Location: **Northwest corner of W. Vaughn Ave. & N. Taigo Dr.** Sampler Type: **Grab** Date Completed: **9/4/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1224.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Increased density; slow drilling *(continued)*					
				110			GW	80	20		W
				115		Decreased density; increased drilling rate					
				120			GW	80	20		W
				125							
				130		Increased coarse sand	GW	70	30		W
				135							
				140							

CYP-WELL COOP & COMM.GPJ 47912.GDT 3/6/14

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-115

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		3d

Project: Cooper & Commerce
Boring: **MW-115**
Pg. 5 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/3/13**

Location: **Northwest corner of W. Vaughn Ave. & N. Taigo Dr.**
Sampler Type: **Grab**
Date Completed: **9/4/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

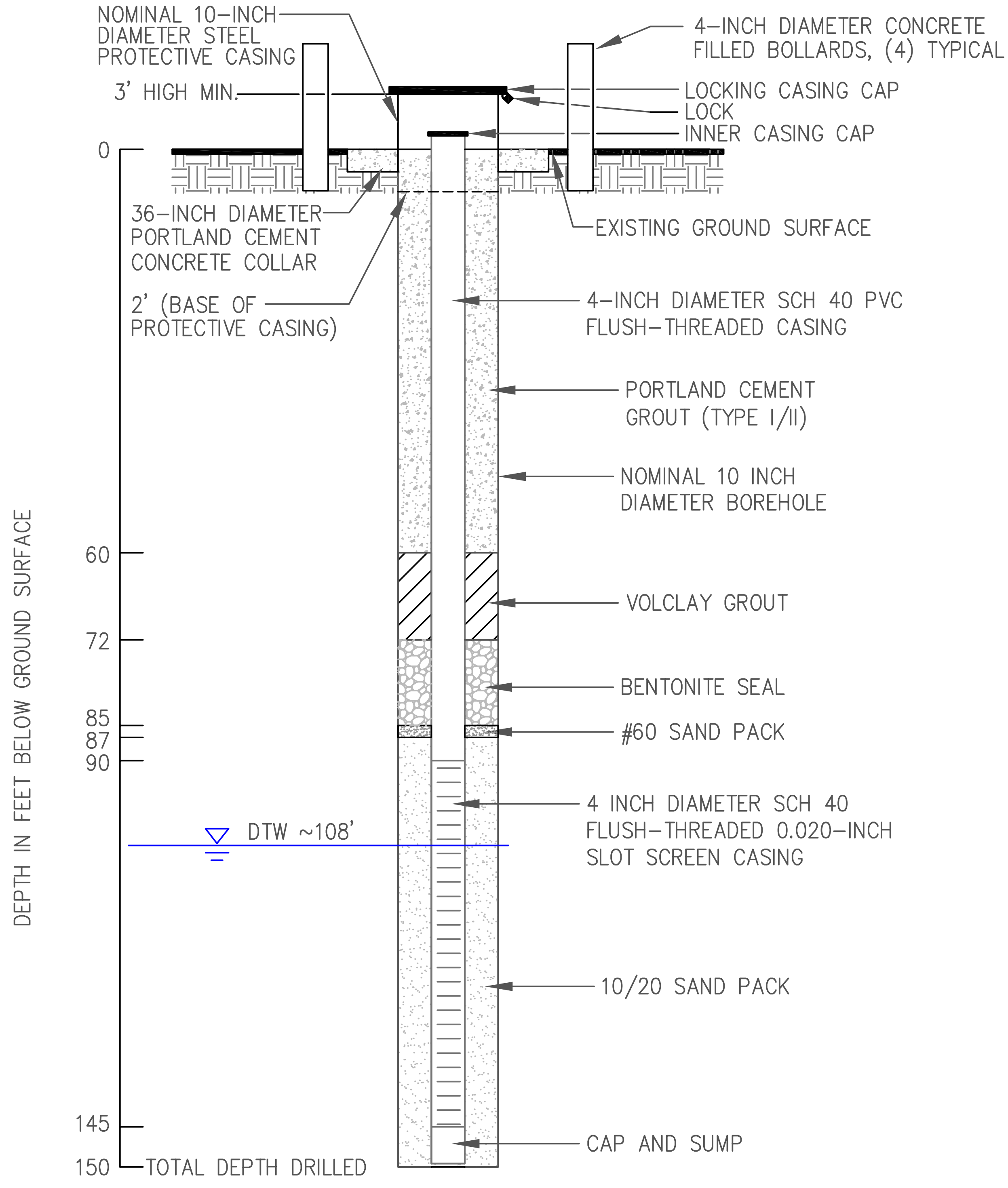
Land Surf. Elev (ft amsl): **1224.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Less coarse sand	GW	80	20		W
				145			GW	80	20		
				150		Total Depth 150' bgs	GW	80	20		

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-115
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		3e



NOT TO SCALE

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GEO
CHEM, INC.

MW-116
ADWR WELL #55-222550
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	**2/28/14**	**JAA**	**2/28/14**	**2010002076A**	

Project: Cooper & Commerce
Boring: **MW-116**
Pg. 1 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **8/26/13**

Location: **West of fuel station, 18' north of fence on Schuff Steel's yard**
Sampler Type: **Grab**
Date Completed: **8/27/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1227.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						BOREHOLE DIAMETER - 10 inches	SM	10	65	25	D
						Silty Sand - Reddish brown (5YR4/4); very fine to medium grained sand; some coarse grained sand; some silt and clay; trace fine subangular gravel; weak cementation					
				5							
				10			SM	10	70	20	D
				15							
				20		Yellowish red (5YR5/6); decreased clay; moderately cemented	SM	10	70	20	D
				25							
				30		Light brown (7.5YR6/4); no gravel; trace coarse grained sand; increased clay and silt	SM		60	40	D
				35							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-116

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		4a

Project: Cooper & Commerce | Boring: **MW-116** | Pg. 2 of 5

Drilling Co: **National Exploration** | Drilling Method: **Air Rotary (Speedstar 50K)** | Date Started: **8/26/13**

Location: **West of fuel station, 18' north of fence on Schuff Steel's yard** | Sampler Type: **Grab** | Date Completed: **8/27/13**

Desc. of Meas Pt: | Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1227.0** | Meas. Pt. Elev: | Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Light brown (7.5YR6/4); no gravel; trace coarse grained sand; increased clay and silt*(continued)*					
				40		Clayey Sand - Reddish brown (5YR8/1); very fine to medium grained sand; with clay and silt	SC		65	35	M
				45							
				50		Sandy Lean Clay - Brown (7.5YR6/3); very fine to medium grained sand with silt; soft; low to no plasticity	CL		30	70	M
				55							
				60		Clayey Sand - Brown (7.5YR6/3); very fine to medium grained sand with silt	SC		65	35	M
				65							
						Well-Graded Sand with Gravel - Light brown (7.5YR6/3); fine to coarse grained sand; fine subangular gravel throughout	SW	30	70		D
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-116

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		4b

Project: Cooper & Commerce Boring: **MW-116** Pg. 3 of 5

Drilling Co: National Exploration
Drilling Method: Air Rotary (Speedstar 50K)
Date Started: 8/26/13
Location: West of fuel station, 18' north of fence on Schuff Steel's yard
Sampler Type: Grab
Date Completed: 8/27/13
Desc. of Meas Pt:
Logged by: S. Sutherland
Land Surf. Elev (ft amsl): 1227.0
Meas. Pt. Elev:
Reviewed by: F. Skocypec

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Sand with Gravel - Light brown (7.5YR6/3); fine to coarse grained sand; fine subangular gravel throughout*(continued)*					
				75		Increased gravel content	SW	30	70		
				80		Decreased gravel; increased coarse sand	SW	20	80		D
						Slow drilling (dense)					
				85							
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine to coarse subangular to subrounded gravel; medium to coarse grained sand; very dense	GW	60	40		
				90			GW	60	40		D
				95							
				100		Trace very fine sand and silt	GW	55	40	5	D
				105							

CYP-WELL COOP & COMM.GPJ 47912.GDT 3/6/14

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-116

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		4c

Project: Cooper & Commerce Boring: **MW-116** Pg. 4 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **8/26/13**

Location: **West of fuel station, 18' north of fence on Schuff Steel's yard** Sampler Type: **Grab** Date Completed: **8/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1227.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Decreased sand and silt; increased gravel	GW	65	35		D
						Groundwater Encountered					
				110		Increased coarse sand	GW	60	40		W
				115							
				120		Increased coarse gravel; decreased sand	GW	80	20		W
				125							
				130		Trace coarse gravel; increased coarse sand	GW	70	30		W
				135							
				140							

HYDRO GEO CHEM, INC.

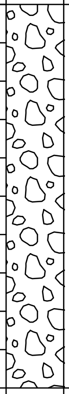
Lithologic Log of Soil Boring MW-116

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		4d

Project: Cooper & Commerce
Boring: **MW-116**
Pg. 5 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **8/26/13**
Location: **West of fuel station, 18' north of fence on Schuff Steel's yard**
Sampler Type: **Grab**
Date Completed: **8/27/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1227.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Increased coarse sand	GW	60	40		W
				145							
				150		Total Depth 150' bgs	GW	60	40		W

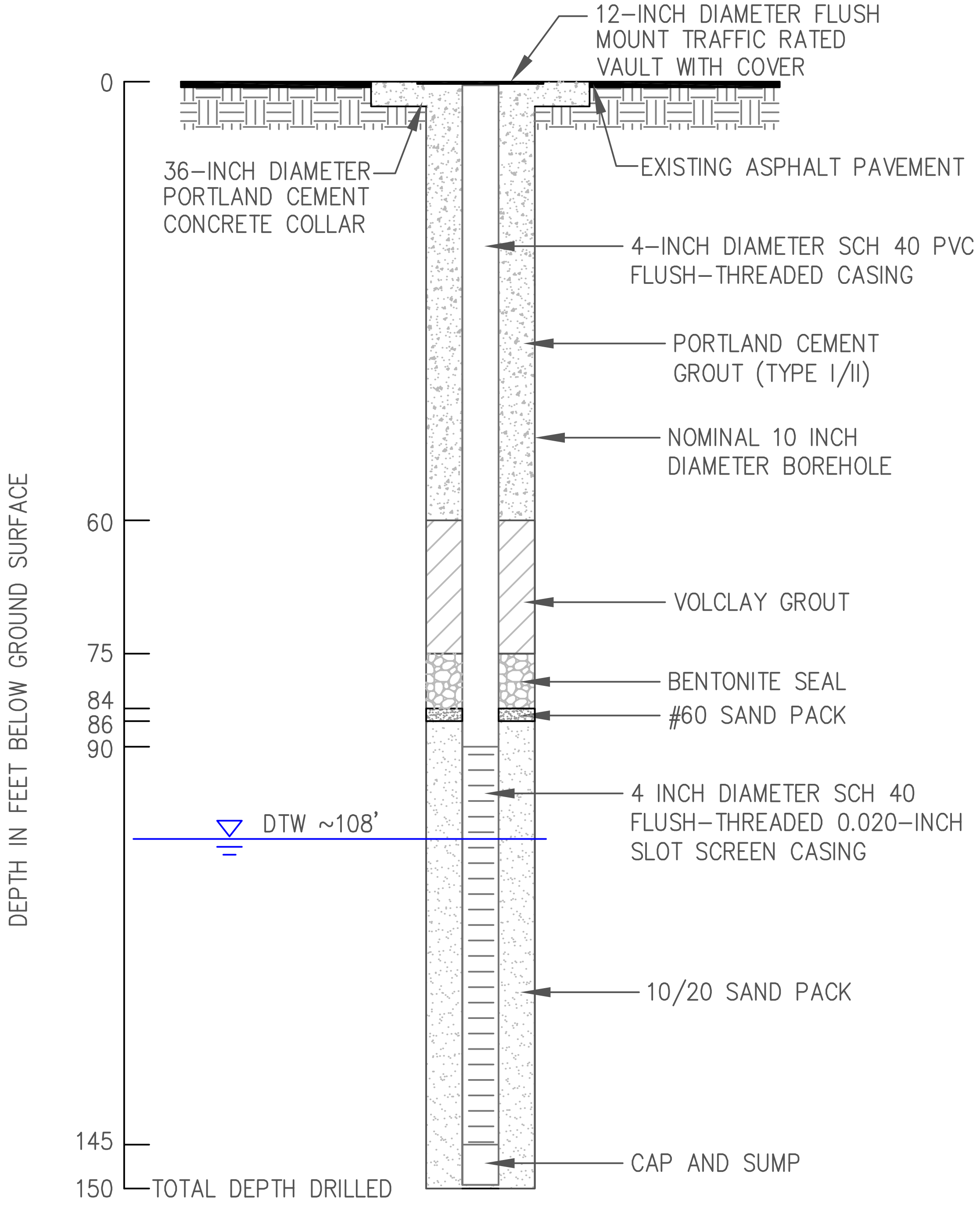
CYP-WELL COOP & COMM.GPJ 47912.GDT 3/6/14

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-116

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/4/14		4e



NOT TO SCALE

HYDRO
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CHEM, INC.

MW-117
ADWR WELL #55-222551
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	**2/28/14**	**JAA**	**2/28/14**	**2010002077A**	

H:\2010002 Cooper&Commerce\RI, GW Mon 2010002.50_.60\GW Monitor Well Installations\2013\MW-115 thru MW-119\Figures\Final Figures\MW117 2010002077A.pdf

Project: Cooper & Commerce

Boring: **MW-117**

Pg. 1 of 5

Drilling Co: **National Exploration**

Drilling Method: **Air Rotary (Speedstar 50K)**

Date Started: **8/28/13**

Location: **Northeast corner of cul-de-sac on W. Commerce Ave.**

Sampler Type: **Grab**

Date Completed: **8/28/13**

Desc. of Meas Pt:

Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**

Meas. Pt. Elev:

Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						BOREHOLE DIAMETER - 10 inches	SM	10	65	25	D
						Asphalt					
						Silty Sand - Reddish Brown (5YR4/4); very fine to medium grained sand; some coarse grained sand; some silt; trace fine subangular to subrounded gravel; weak cementation					
				5							
				10		Decreased fines	SM	10	70	20	D
				15							
				20		Brown (7.5YR5/4); increased fines; some clay; no gravel; moderately cemented nodules throughout	SM		70	30	D
				25							
				30		Light brown (7.5YR6/4); trace coarse grained sand; increased silt and clay; strongly cemented nodules throughout	SM		60	40	D
				35							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-117

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		5a

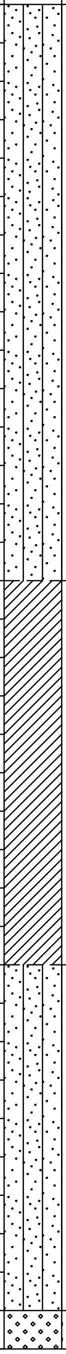
Project: Cooper & Commerce Boring: **MW-117** Pg. 2 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **8/28/13**

Location: **Northeast corner of cul-de-sac** Sampler Type: **Grab** Date Completed: **8/28/13**

on W. Commerce Ave. Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Light brown (7.5YR6/4); trace coarse grained sand; increased silt and clay; strongly cemented nodules throughout*(continued)*					
				40		Increased clay	SM		60	40	M
				45							
				50		Sandy Lean Clay - Brown (7.5YR5/3); clay, with very fine to medium grained sand and silt; low plasticity	CL		30	70	M
				55							
				60		Silty Sand - Light brown (7.5YR6/3); very fine to fine grained sand with silt; some clay	SM		60	40	M
				65							
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-117

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		5b

Project: **Cooper & Commerce** Boring: **MW-117** Pg. **3** of **5**

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **8/28/13**
Location: **Northeast corner of cul-de-sac on W. Commerce Ave.**
Sampler Type: **Grab**
Date Completed: **8/28/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
					⁘	Well-Graded Sand with Gravel - Light brown (7.5YR6/3); fine to coarse grained sand; with fine subangular to subrounded gravel; trace coarse subangular to subrounded gravel *(continued)*	SW	35	65		D
				75	⁘						
				80	⁘	Primarily medium to coarse grained sand; increased gravel	SW	40	60		D
				85	⁘						
				90	⁘	Increased fines; some very fine sand; trace silt	SW	35	60	5	D
				95	⁘						
				100	°	Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine to coarse subangular to subrounded gravel; with medium to coarse grained sand; very dense	GW	60	40		D
				105	°						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-117

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		5c

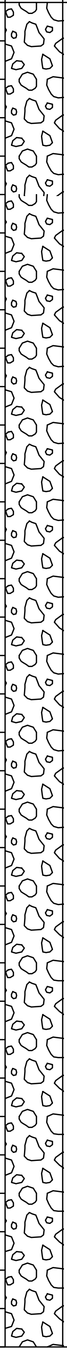
Project: Cooper & Commerce Boring: **MW-117** Pg. 4 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **8/28/13**

Location: **Northeast corner of cul-de-sac on W. Commerce Ave.** Sampler Type: **Grab** Date Completed: **8/28/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine to coarse subangular to subrounded gravel; with medium to coarse grained sand; very dense*(continued)*					
						Groundwater encountered					
				110		Primarily fine gravel and coarse sand; trace coarse gravel; trace medium grained sand	GW	60	40		W
				115							
				120		Increased coarse subangular to subrounded gravel; decreased coarse sand; no medium grained sand	GW	80	20		W
				125							
				130		Trace coarse gravel; increased coarse grained sand	GW	70	30		W
				135							
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-117

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		5d

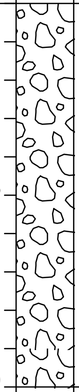
Project: Cooper & Commerce Boring: **MW-117** Pg. 5 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **8/28/13**

Location: **Northeast corner of cul-de-sac on W. Commerce Ave.** Sampler Type: **Grab** Date Completed: **8/28/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

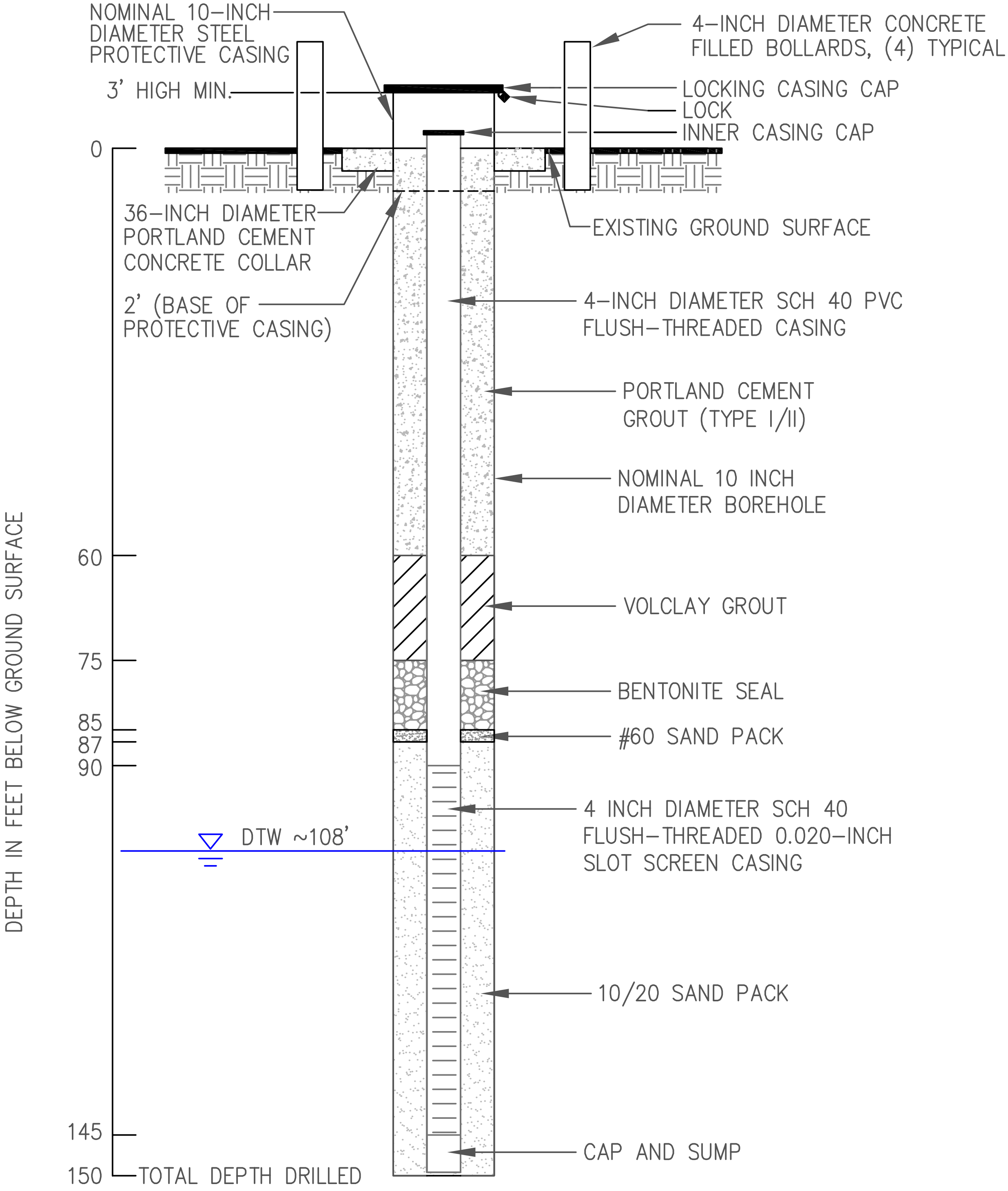
Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Increased coarse gravel	GW	70	30		W
				145							
						Very dense					
				150							
						Total Depth 150' bgs	GW	70	30		W

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-117

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**5e**



NOT TO SCALE

HYDRO
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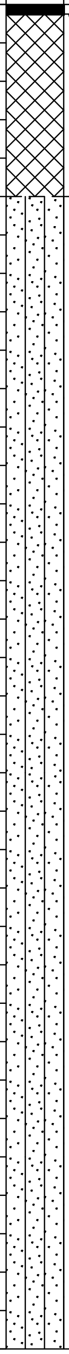
CHEM, INC.

MW-118
ADWR WELL #55-222552
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	**2/28/14**	**JAA**	**2/28/14**	**2010002078A**	

Project: Cooper & Commerce
Boring: **MW-118**
Pg. 1 of 5

Drilling Co:	**National Exploration**	Drilling Method:	**Air Rotary (Speedstar 50K)**	Date Started:	**9/6/13**
Location:	**Neely Ranch Riparian Preserve - Southeast of MW-119S/119D**	Sampler Type:	**Grab**	Date Completed:	**9/9/13**
		Desc. of Meas Pt:		Logged by:	**S. Sutherland**
Land Surf. Elev (ft amsl):	**1228.0**	Meas. Pt. Elev:		Reviewed by:	**F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					BOREHOLE DIAMETER - 10 inches					D
					Fill material (silty sand)					
				5	Silty Sand - Reddish brown (5YR4/4); very fine to medium grained sand; trace coarse sand; trace silt and clay; weakly cemented nodules	SM		75	25	D
				10						
				15						
				20	Brown (7.5YR5/4); increased fines; no cementation	SM		70	30	D
				25						
				30	Light brown (7.5YR6/4); increased silt and clay content; moderately cemented nodules throughout	SM		60	40	D
				35						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-118

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		6a

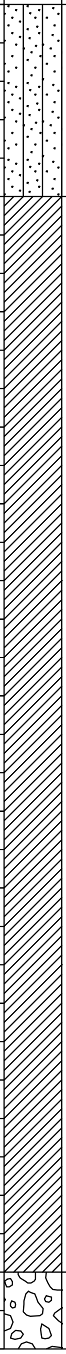
Project: Cooper & Commerce Boring: **MW-118** Pg. 2 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **9/6/13**

Location: **Neely Ranch Riparian Preserve - Southeast of MW-119S/119D** Sampler Type: **Grab** Date Completed: **9/9/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1228.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Increased clay	SM		55	45	
				40		Sandy Lean Clay - Brown (7.5YR5/3); very fine to medium grained sand with silt; low plasticity; strongly cemented nodules throughout	CL		30	70	M
				45							
				50		Decreased sand	CL		25	75	M
				55							
				60		Increased sand; moderately cemented nodules	CL		35	65	M
				65							
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine and coarse subangular and subrounded gravel; some coarse grained sand; trace silt	GW	75	20	5	D
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-118

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		6b

Project: Cooper & Commerce
Boring: **MW-118**
Pg. 3 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/6/13**

Location: **Neely Ranch Riparian Preserve - Southeast of MW-119S/119D**
Sampler Type: **Grab**
Date Completed: **9/9/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1228.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine and coarse subangular and subrounded gravel; some coarse grained sand; trace silt*(continued)*					
				75							
				80		Increased coarse gravel; trace coarse sand	GW	90	10		D
				85							
				90		Decreased coarse gravel; increased coarse sand	GW	75	25		D
				95							
				100			GW	75	25		M
				105							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-118

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**6c**

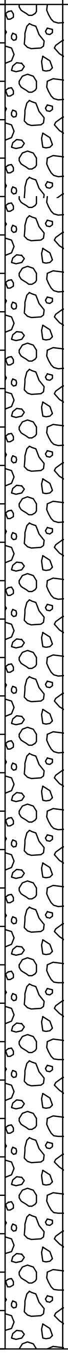
Project: Cooper & Commerce
Boring: **MW-118**
Pg. 4 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/6/13**

Location: **Neely Ranch Riparian Preserve - Southeast of MW-119S/119D**
Sampler Type: **Grab**
Date Completed: **9/9/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1228.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Decreased coarse gravel; increased coarse sand *(continued)*					
						Groundwater encountered					
				110		Little coarse gravel	GW	80	20		W
				115							
				120		Little coarse sand	GW	90	10		W
				125							
				130		Increased coarse sand	GW	70	30		W
				135							
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-118

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		6d

Project: Cooper & Commerce
Boring: **MW-118**
Pg. 5 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/6/13**

Location: **Neely Ranch Riparian Preserve - Southeast of MW-119S/119D**
Sampler Type: **Grab**
Date Completed: **9/9/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1228.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

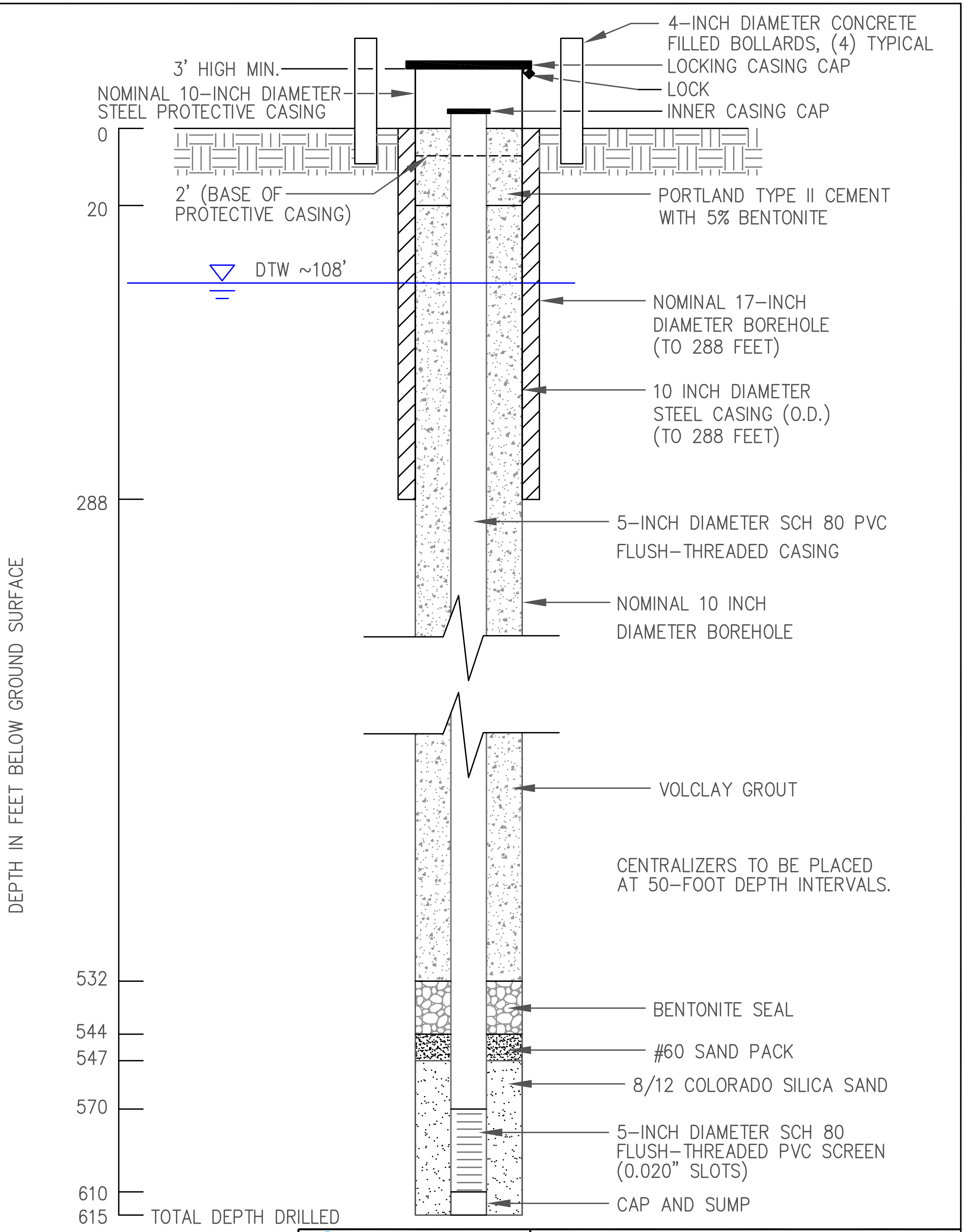
Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Increased coarse sand*(continued)*	GW	70	30		W
				145		Decreased coarse sand	GW	80	20		W
				150		Total Depth 150' bgs	GW	80	20		W

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-118

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		6e



HYDRO
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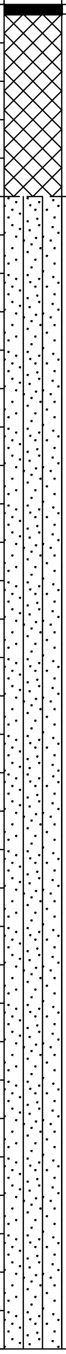
MW-119D
ADWR WELL #55-222554
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	**2/28/14**	**JAA**	**2/28/14**	**2010002080A**	

H:\2010002 Cooper&Commerce\RI, GW Mon 2010002.50_.60\GW Monitor Well Installations\2013\MW-115 thru MW-119\Figures\Final Figures\MW119S 2010002079A.pdf

Project: Cooper & Commerce
Boring: **MW-119D**
Pg. 1 of 18
Drilling Co: **National Exploration**
Drilling Method: **Mud Rotary (Speedstar 50K)**
Date Started: **9/13/13**
Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/27/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



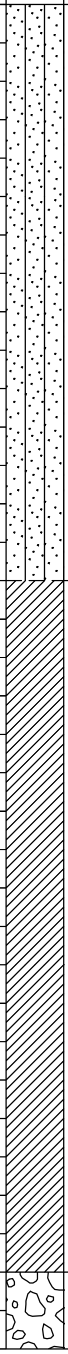
Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					BOREHOLE DIAMETER - 17 inches (to 280')					
					Fill material (silty sand and gravel)					
				5	Silty Sand - Reddish brown (5YR4/4); very fine to medium grained sand; some coarse grained sand; trace clay; moderately cemented nodules throughout	SM		80	20	D
				10						
				15						
				20	Light brown (7.5YR6/4); increased fines; some strongly cemented nodules	SM		70	30	D
				25						
				30	Decreased medium to coarse grained sand; increased clay and silt; trace fine subangular to subrounded gravel	SM	5	55	40	
				35						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8a

Project: Cooper & Commerce Boring: **MW-119D** Pg. 2 of 18
Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**
Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**
Desc. of Meas Pt: Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Decreased medium to coarse grained sand; increased clay and silt; trace fine subangular to subrounded gravel*(continued)*					
				40		Increased clay; trace coarse sand; no gravel	SM		55	45	
				45							
				50		Sandy Lean Clay - clay, with very fine to fine grained sand; trace coarse grained sand; with silt; low to no plasticity	CL		30	70	
				55							
				60		Increased coarse sand; decreased clay	CL		35	65	
				65							
						Well-Graded Gravel with Silt and Sand - Fine to coarse subangular to subrounded gravel; some coarse grained sand; trace medium to fine grained sand; some silt	GW	70	20	10	
				70							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8b

Project: Cooper & Commerce Boring: **MW-119D** Pg. 3 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Gravel with Silt and Sand - Fine to coarse subangular to subrounded gravel; some coarse grained sand; trace medium to fine grained sand; some silt *(continued)*					
				75							
				80		Well Graded Gravel with Sand - Fine to Coarse subangular to subrounded gravel; with coarse grained sand; some fine to medium grained sand	GW	60	40		
				85							
				90		Increased fine to medium grained sand; decreased gravel	GW	55	45		
						Well-Graded Sand with Silt - Fine to coarse grained sand; trace silt; no gravel	SW		90	10	
				95							
				100		Well-Graded Gravel with Sand - Fine subangular to subrounded gravel; some medium to coarse grained sand	SW	65	35		
				105							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8c

Project: **Cooper & Commerce** Boring: **MW-119D** Pg. **4** of **18**

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Well-Graded Gravel with Sand - Fine subangular to subrounded gravel; some medium to coarse grained sand *(continued)*	GW	65	35		
				110							
				115							
				120		Increased gravels; decreased medium to coarse grained sand	GW	80	20		
				125							
				130		Increased sand	GW	70	30		
				135		Drilling slowed					
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**8d**

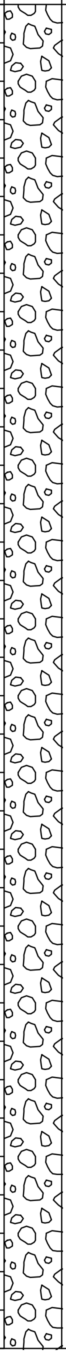
Project: Cooper & Commerce　　Boring: **MW-119D**　　Pg. 5 of 18

Drilling Co: **National Exploration**　　Drilling Method: **Mud Rotary (Speedstar 50K)**　　Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**　　Sampler Type: **Grab**　　Date Completed: **9/27/13**

Desc. of Meas Pt:　　Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**　　Meas. Pt. Elev:　　Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Only fine subrounded to subangular gravel; trace coarse grained sand	GW	90	10		
				145							
				150		Increased coarse grained sand	GW	75	25		
				155							
				160			GW	75	25		
				165							
				170		Decreased gravel and increased coarse grained sand	GW	60	40		
				175							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8e

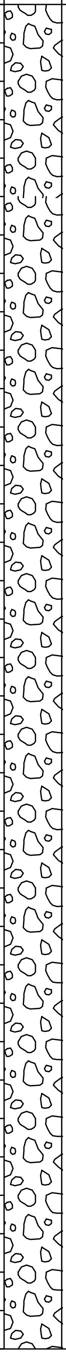
Project: Cooper & Commerce Boring: **MW-119D** Pg. 6 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
						Decreased gravel and increased coarse grained sand *(continued)*					
				180		Decreased coarse grained sand; increased coarse gravel and cobbles	GW	80	20		
				185							
				190		No cobbles; increased medium to coarse grained sand; trace fine sand	GW	60	40		
				195							
				200		Trace fine to medium grained sand	GW	70	30		
				205							
				210							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8f

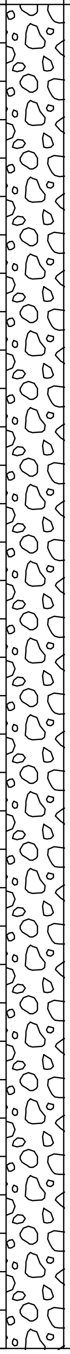
Project: Cooper & Commerce Boring: **MW-119D** Pg. 7 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR			Moisture
								GR	SA	FI	
						Increased fine to medium grained sand; decreased coarse grained sand; gravel is subrounded and uniform in size	GW	70	30		
				215							
				220							
							GW	75	25		
				225							
				230							
						Decreased sand	GW	80	20		
				235							
				240							
						Increased sand	GW	70	30		
				245							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**8g**

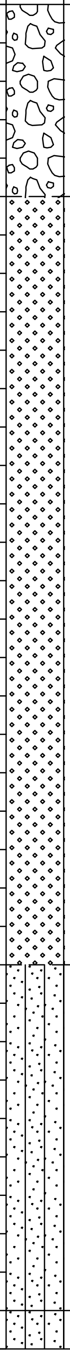
Project: **Cooper & Commerce** Boring: **MW-119D** Pg. **8** of **18**

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					Increased sand *(continued)*					
				250	Well-Graded Sand with Gravel - Fine to coarse grained sand; some very fine grained sand; with fine to coarse subrounded to subangular gravel	SW	35	65		
				255	Decreasing gravel content	SW	25	75		
				260	Trace fine subangular gravel; increased fine to very fine grained sand; some silt and clay	SW	10	80	10	
				265						
				270	Silty Sand - Very fine to fine grained sand and silt; trace coarse grained sand; trace subangular gravel; some clay	SM	10	75	15	
				275						
				280	BOREHOLE DIAMETER - 10 inches					

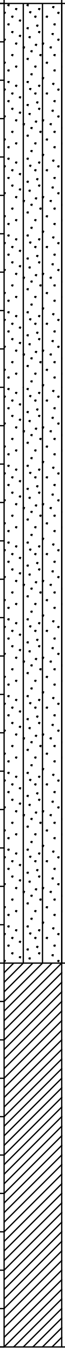
HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8h

Project: Cooper & Commerce
Boring: **MW-119D**
Pg. 9 of 18
Drilling Co: **National Exploration**
Drilling Method: **Mud Rotary (Speedstar 50K)**
Date Started: **9/13/13**
Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/27/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Increased clay	SM	5	60	35	
				285							
				290							
						No gravel; decreased clay	SM		70	30	
				295							
				300							
							SM		70	30	
				305		Sandy Lean Clay - clay with low plasticity; very fine to medium grained sand; trace coarse grained sand; with silt	CL		40	60	
				310			CL		40	60	
				315							

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8i

Project: Cooper & Commerce Boring: **MW-119D** Pg. 10 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
					▨	Sandy Lean Clay - clay with low plasticity; very fine to medium grained sand; trace coarse grained sand; with silt *(continued)*					
				320	▨	Increased clay content; increased plasticity	CL		30	70	
				325	▨						
				330	▨		CL		30	70	
				335	▨						
				340	▨	Increased fine to medium grained sand	CL		35	65	
				345	▨						
				350	▨						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8j

Project: Cooper & Commerce Boring: **MW-119D** Pg. 11 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					▨	Increased fine to medium grained sand*(continued)*					
				355	▨						
				360	▨	Increased sand; low plasticity	CL		40	60	
				365	▨						
				370	▨	Increased clay content; medium to highly plastic	CL		15	85	
				375	▨						
				380	▨		CL		15	85	
				385	▨						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		**8k**

Project: Cooper & Commerce Boring: **MW-119D** Pg. 12 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Silty Sand with Gravel - Very fine to medium grained sand and silt; some clay; some fine subrounded to subangular gravel	SM	15	55	30	
				390							
				395							
				400		Some coarse grained sand; trace fine gravel	SM	5	75	20	
				405							
				410		Increased coarse grained sand; slightly decreased very fine to medium grained sand	SM	10	65	25	
				415		Sandy Lean Clay - Clay, with very fine to medium grained sand; some coarse grained sand; some silt; trace fine subrounded gravel; low plasticity	CL	5	35	60	
				420							

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8I

Project: Cooper & Commerce　Boring: **MW-119D**　Pg. 13 of 18

Drilling Co: **National Exploration**　Drilling Method: **Mud Rotary (Speedstar 50K)**　Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**　Sampler Type: **Grab**　Date Completed: **9/27/13**

Desc. of Meas Pt:　Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**　Meas. Pt. Elev:　Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					▨	Sandy Lean Clay - Clay, with very fine to medium grained sand; some coarse grained sand; some silt; trace fine subrounded gravel; low plasticity *(continued)*	CL	5	35	60	
				425	▨						
				430	▨		CL	5	35	60	
				435	▨						
				440	▨	No gravel; decreased sand; no coarse grained sand; medium to high plasticity	CL		20	80	
				445	▨						
				450	▨						
				455	▨						

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8m

Project: Cooper & Commerce Boring: **MW-119D** Pg. 14 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					▨	No gravel; decreased sand; no coarse grained sand; medium to high plasticity *(continued)*					
				460	▨	Some fine subrounded to subangular gravel; trace very fine to coarse grained sand; some silt	CL	25	10	65	
				465	▨	Decreased gravel and increased sand	CL	15	25	60	
				470	▨		CL	15	25	60	
				475	▨						
				480	░	Silty Sand - Very fine to medium grained sand; some coarse grained sand; some silt; trace clay	SM		80	20	
				485	░						
				490	░						

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8n

Project: Cooper & Commerce Boring: **MW-119D** Pg. 15 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
					▨	Lean Clay with Sand - Very fine to medium grained sand; trace coarse grained sand; some silt; low to medium plasticity	CL		25	75	
				495	▨						
				500	▨	Trace fine subrounded to rounded gravels	CL	5	20	75	
				505	▨						
				510	▨	No Gravel	CL		25	75	
				515	▨						
				520	▨	Increase in very fine to medium grained sand; decrease in clay; low plasticity	CL		40	60	
				525	▨						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8o

Project: Cooper & Commerce Boring: **MW-119D** Pg. 16 of 18

Drilling Co: **National Exploration** Drilling Method: **Mud Rotary (Speedstar 50K)** Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/27/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					▨	Increase in very fine to medium grained sand; decrease in clay; low plasticity*(continued)*					
				530	▨		CL		40	60	
				535	▨						
				540	▨	Trace coarse grained sand	CL		40	60	
				545	▨						
				550	⁙	Silty Sand - Very fine to medium grained sand; some coarse grained sand; with clay and silt, some fine subrounded gravel	SM	10	50	40	
				555	⁙						
				560	⁙						

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8p

Project: Cooper & Commerce　　Boring: **MW-119D**　　Pg. 17 of 18

Drilling Co: **National Exploration**
Drilling Method: **Mud Rotary (Speedstar 50K)**
Date Started: **9/13/13**
Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/27/13**
Desc. of Meas Pt:
Logged by: **S. Sutherland**
Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
					░	Silty Sand - Very fine to medium grained sand; some coarse grained sand; with clay and silt, some fine subrounded gravel *(continued)*	SM	10	50	40	
				565	░						
				570	▨	Gravelly Lean Clay - Clay, with fine subrounded to subangular gravel; some very fine to medium grained sand; trace coarse grained sand; with silt	CL	30	15	55	
				575	▨						
				580	░	Silty Sand - Very fine to medium grained sand; with coarse grained sand; with silt; some clay; trace fine gravel	SM	5	75	20	
				585	░						
				590	░	Increased fines; decreased coarse grained sand	SM	5	70	25	
				595	░						

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Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		**8q**

Project: Cooper & Commerce　Boring: **MW-119D**　Pg. 18 of 18

Drilling Co: **National Exploration**　Drilling Method: **Mud Rotary (Speedstar 50K)**　Date Started: **9/13/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**　Sampler Type: **Grab**　Date Completed: **9/27/13**

Desc. of Meas Pt:　Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**　Meas. Pt. Elev:　Reviewed by: **F. Skocypec**

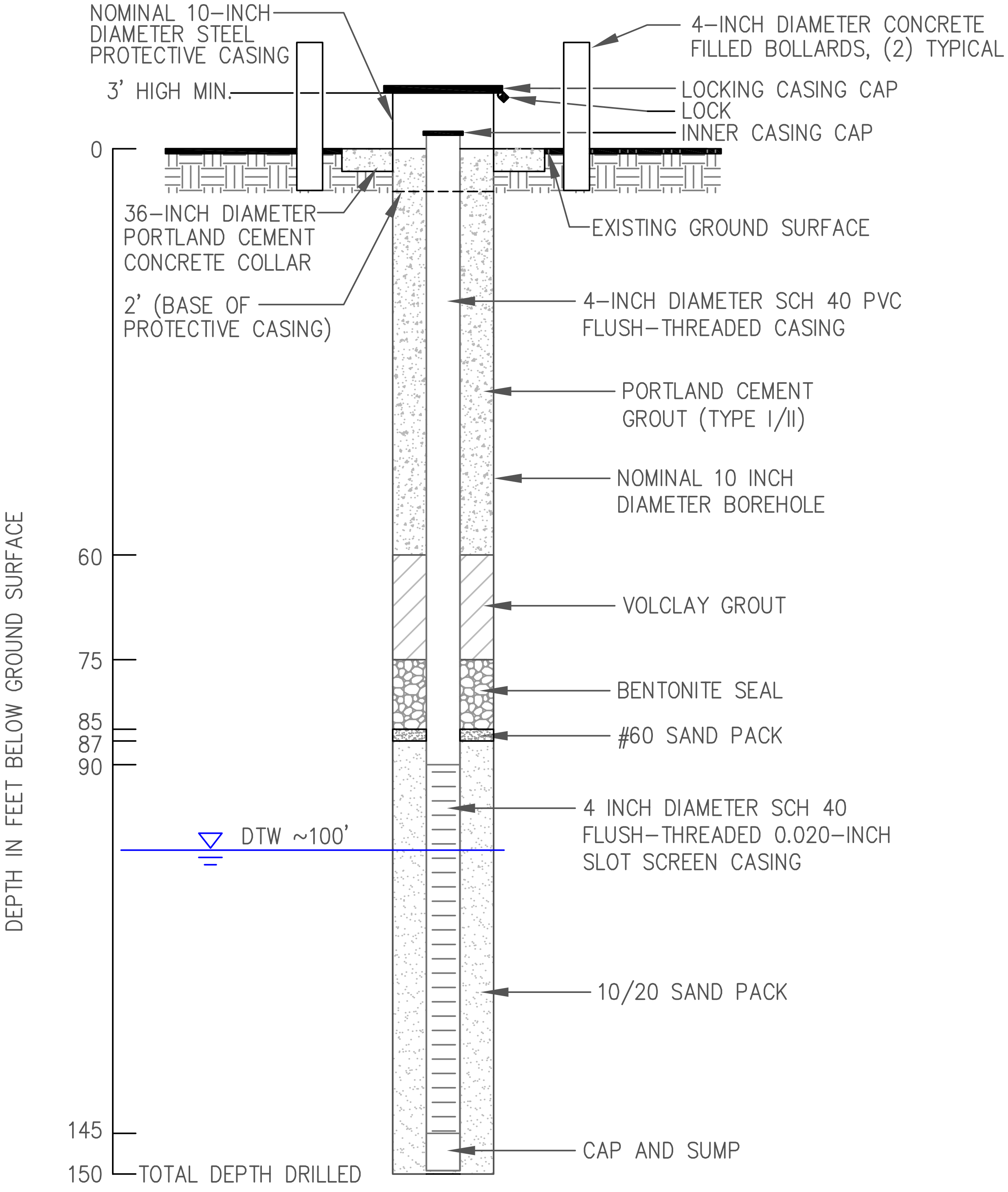
Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Increased fines; decreased coarse grained sand *(continued)*					
				600		Increased clay; trace coarse grained sand; no gravels	SM		65	35	
				605							
				610		Decreased clay; primarily very fine to fine sand; with silt	SM		75	25	
						Increased gravel and decreased clay	SM	20	65	15	
				615		No gravels; trace coarse grained sand; trace clay	SM		75	25	
				620		Total Depth 620' bgs	SM		80	20	

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119D

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		8r



NOT TO SCALE

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MW-119S
ADWR WELL #55-222553
MONITORING WELL DIAGRAM

Approved	Date	Author	Date	File Name	Figure
SPS	**2/28/14**	**JAA**	**2/28/14**	**2010002079A**	

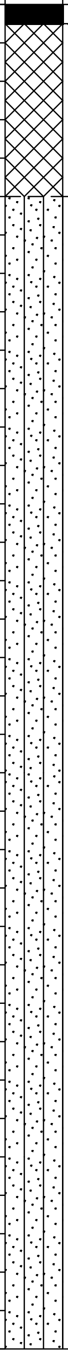
Project: Cooper & Commerce
Boring: **MW-119S**
Pg. 1 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/10/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/11/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
						BOREHOLE DIAMETER - 10 inches					
						Fill Material (sillty sand and gravel)					
				5		Silty Sand - Reddish brown (5YR4/4); very fine to medium grained sand; some coarse grained sand; trace clay; moderately cemented nodules throughout	SM		80	20	D
				10							
				15							
				20		Light brown (7.5YR6/4); increased fines; some strongly cemented nodules	SM		70	30	D
				25							
				30		Decreased medium to coarse grained sand; increased silt and clay content; strongly cemented	SM		60	40	D
				35							

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Lithologic Log of Soil Boring MW-119S

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**7a**

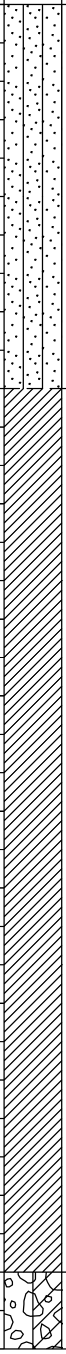
Project: Cooper & Commerce
Boring: **MW-119S**
Pg. 2 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/10/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/11/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**



Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
					Decreased medium to coarse grained sand; increased silt and clay content; strongly cemented *(continued)*					
				40	Increased clay	SM		55	45	D
				45	Sandy Lean Clay - Brown (7.5YR5/3); clay, with very fine to medium grained sand; with silt; low to no plasticity; strongly cemented nodules throughout	CL		30	70	M
				50	Decreased sand	CL		25	75	M
				55						
				60	Increased sand and silt; decreased clay; some strongly cemented nodules	CL		35	65	M
				65						
					Well-Graded Gravel with Clay and Sand - Light brown (7.5YR6/3); fine to coarse subrounded to subangular gravel; some coarse grained sand; trace medium to fine grained sand; some silt	GW-GC	70	20	10	D
				70						

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119S
Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		7b

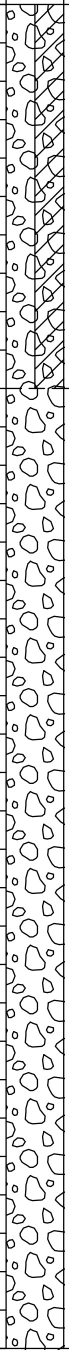
Project: Cooper & Commerce Boring: **MW-119S** Pg. 3 of 5

Drilling Co: **National Exploration** Drilling Method: **Air Rotary (Speedstar 50K)** Date Started: **9/10/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve** Sampler Type: **Grab** Date Completed: **9/11/13**

Desc. of Meas Pt: Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0** Meas. Pt. Elev: Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
						Well-Graded Gravel with Clay and Sand - Light brown (7.5YR6/3); fine to coarse subrounded to subangular gravel; some coarse grained sand; trace medium to fine grained sand; some silt*(continued)*					
				75							
				80		Well-Graded Gravel with Sand - Light brown (7.5YR6/3); fine to coarse subrounded to subangular gravel; with coarse grained sand	GW	65	35		
				85							
				90			GW	65	35		
				95							
				100		Decreased gravel (primarily fine subrounded to subangular gravel) some fine to medium grained sand	GW	60	40		
				105							

CYP-WELL COOP & COMM.GPJ 47912.GDT 3/6/14

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119S

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		7c

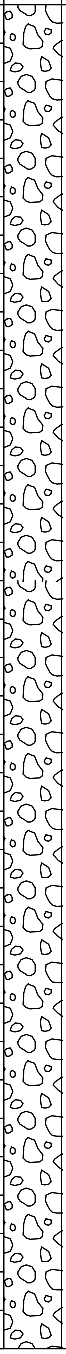
Project: Cooper & Commerce
Boring: **MW-119S**
Pg. 4 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/10/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/11/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Decreased gravel (primarily fine subrounded to subangular gravel) some fine to medium grained sand*(continued)*					
						Groundwater encountered					
				110			GW	60	40		W
				115							
				120		Increased coarse gravel; little coarse grained sand; trace fine to medium grained sand	GW	90	10		W
				125							
				130		Increased fine gravels; increased coarse grained sand	GW	70	30		W
				135							
				140							

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119S

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	3/5/14		7d

Project: Cooper & Commerce
Boring: **MW-119S**
Pg. 5 of 5

Drilling Co: **National Exploration**
Drilling Method: **Air Rotary (Speedstar 50K)**
Date Started: **9/10/13**

Location: **Northwest corner in the Neely Ranch Riparian Preserve**
Sampler Type: **Grab**
Date Completed: **9/11/13**

Desc. of Meas Pt:
Logged by: **S. Sutherland**

Land Surf. Elev (ft amsl): **1229.0**
Meas. Pt. Elev:
Reviewed by: **F. Skocypec**

Paste pH	Water pH	EC (uS/cm)	HCL Reaction	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF			Moisture
								GR	SA	FI	
						Increased fine gravels; increased coarse grained sand *(continued)*	GW	70	30		W
				145							
				150		Decreased coarse sand and coarse gravel					
						Total Depth 150' bgs	GW	85	15		W

CYP-WELL COOP & COMM.GPJ 47912.GDT 3/6/14

HYDRO GEO CHEM, INC.

Lithologic Log of Soil Boring MW-119S

Cooper & Commerce WQARF Site

Approved	Date	Revised	Date	Reference:	FIG.
		WAT	**3/5/14**		**7e**

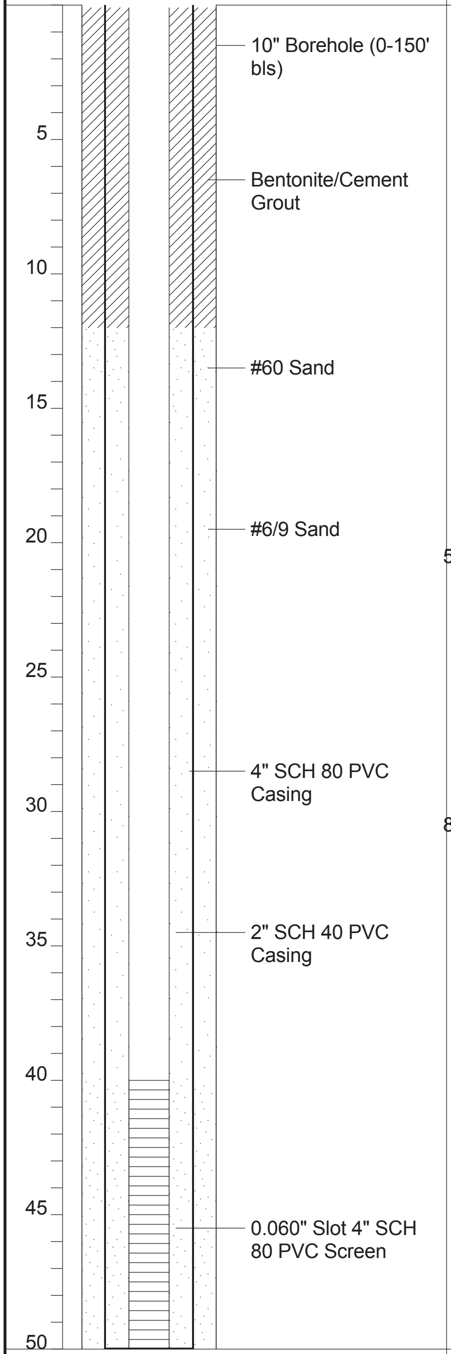
APPENDIX E

LITHOLOGIC LOGS AND WELL CONSTRUCTION DIAGRAMS FOR SVE WELLS, VAPOR PROBES, AND EXTRACTION WELL

Project: COOPER AND COMMERCE WQARF SITE
Boring: **AS/SVE-101**
Pg. 1 of 3

Drilling Co:	**Water Development Corp.**	Drilling Method:	**Air Rotary Casing Hammer**	Date Started:	**4/20/06**
Location:		Sampler:		Date Completed:	**4/24/06**
		Desc. of Meas Pt:		Logged by:	**Nathan Haws**
Land Surf. Elev:		Meas. Pt. Elev:		Reviewed by:	**RP**

WELL COMPLETION



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
12 28 19	50	1.5		10	▨	LEAN CLAY; Reddish brown (5YR 4/4); high plasticity; dry.	CL	0	5	95	D
50/6"	35	9.4		20	▨	LEAN CLAY; Reddish brown (5YR 4/5); fine sand; high plasticity; dry.	CL	0	5	95	D
80/6"	35	14.2		30	▨	LEAN CLAY; Reddish brown (5YR 4/4); very dense; high plasticity; dry.	CL	0	5	95	D
15 20	90	22.3		40	▨	LEAN CLAY; Reddish brown (5YR 4/4); high plasticity; moist.	CH	0	5	95	M

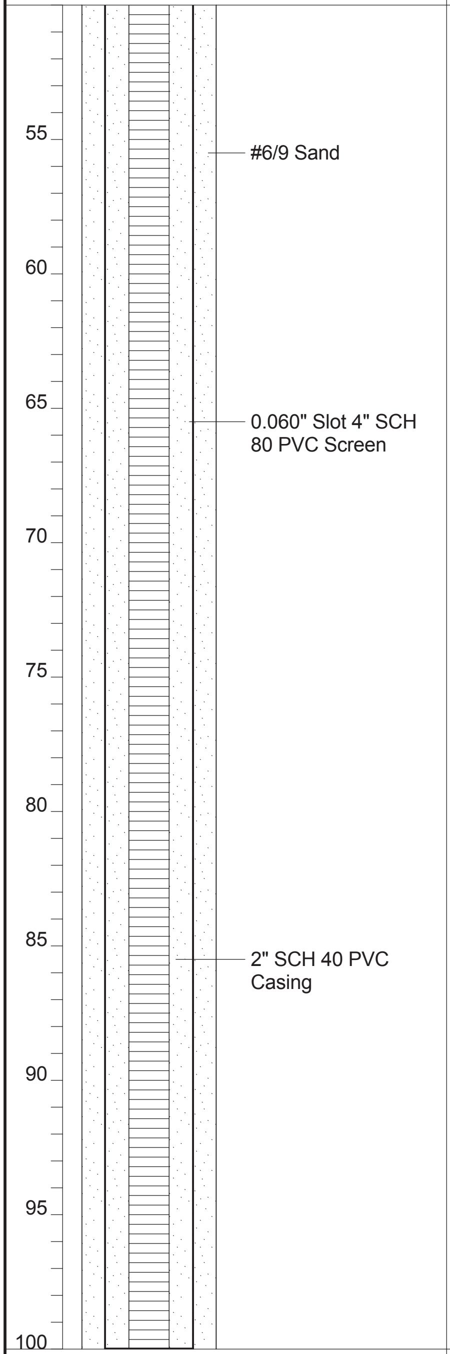
HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of AS/SVE-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	1a

Project: COOPER AND COMMERCE WQARF SITE
Boring: **AS/SVE-101** Pg. 2 of 3
Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/20/06**
Location:
Sampler:
Date Completed: **4/24/06**
Desc. of Meas Pt:
Logged by: **Nathan Haws**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION



Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
	9 21	90	9.3		LEAN CLAY; Reddish brown (5YR 4/4); high plasticity; moist.	CH	0	5	95	M
60	21 32	95	6.3		LEAN CLAY WITH SAND AND GRAVEL; Reddish brown (5YR 5/3); high plasticity; very moist.	CL	10	10	80	M
70	13 24	100	7.5		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); poorly graded fine sand; high plasticity; very moist.	CL	0	15	85	M
80	N/A	0	N/A		WELL GRADED SAND WITH CLAY AND GRAVEL; (5YR 4/4).	SW-SC	20	70	10	M
90	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	80	20	0	M
100										

HGC-WELL2 833000.GPJ NEWPROJ.GDT 8/10/06

HYDRO GEO CHEM, INC.

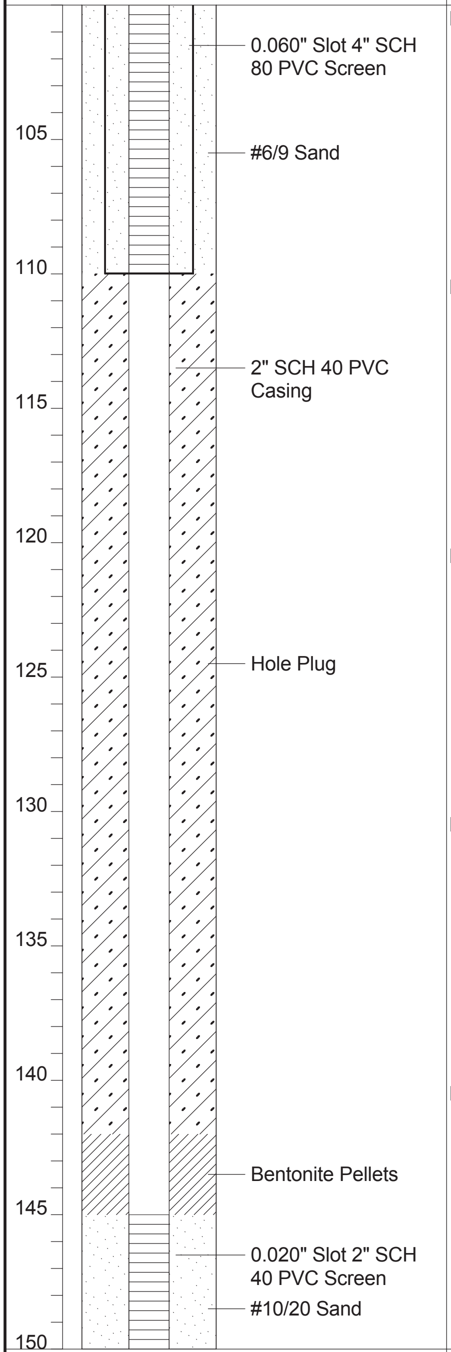
Lithologic Log and Well Construction Details of AS/SVE-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	1b

Project: COOPER AND COMMERCE WQARF SITE
Boring: **AS/SVE-101**
Pg. 3 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/20/06**
Location:
Sampler:
Date Completed: **4/24/06**
Desc. of Meas Pt:
Logged by: **Nathan Haws**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION



Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
100	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	80	20	0	M
110	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	65	35	0	M
120	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	65	35	0	M
130	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	65	35	0	M
140	N/A	0	N/A		WELL GRADED GRAVEL; (5YR 4/4); angular.	GW	65	35	0	M

HGC-WELL2 833000.GPJ NEWPROJ.GDT 8/10/06

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of AS/SVE-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	1c

Project: COOPER AND COMMERCE WQARF SITE   Boring: **AS/SVE-102**   Pg. 1 of 3

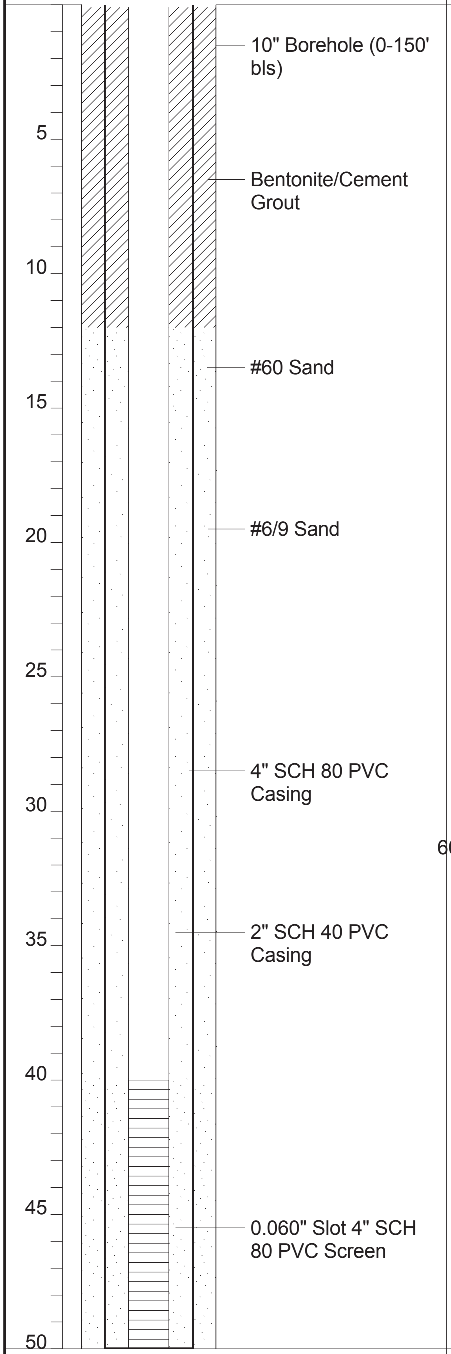
Drilling Co: **Water Development Corp.**   Drilling Method: **Air Rotary Casing Hammer**   Date Started: **4/18/06**

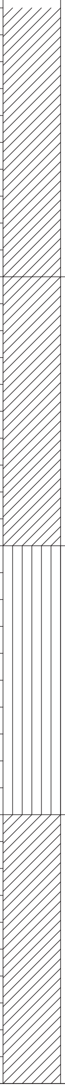
Location: Sampler: Date Completed: **4/20/06**

Desc. of Meas Pt: Logged by: **Nathan Haws**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **RP**

WELL COMPLETION





Depth - FT.	Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
10	8 17	50	6.6		LEAN CLAY; Reddish brown (5YR 4/3); poorly graded fine sand; high plasticity; slightly moist.	CL	0	5	95	M
20	15 66	80	19.4		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); poorly graded fine sand; high plasticity; dry to slightly moist.	CL	0	15	85	M
30	17 60/12"	40	26.9		SANDY SILT; Reddish brown (5YR 4/3); fine sand and clay; medium plasticity; dry.	ML	0	40	60	D
40	12 13 17	90	28.0		LEAN CLAY; Light reddish brown (5YR 6/3); high plasticity; moist.	CL	0	5	95	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of AS/SVE-102

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	2a

Project: COOPER AND COMMERCE WQARF SITE

Boring: **AS/SVE-102**

Pg. 2 of 3

Drilling Co: **Water Development Corp.**

Drilling Method: **Air Rotary Casing Hammer**

Date Started: **4/18/06**

Location:

Sampler:

Date Completed: **4/20/06**

Desc. of Meas Pt:

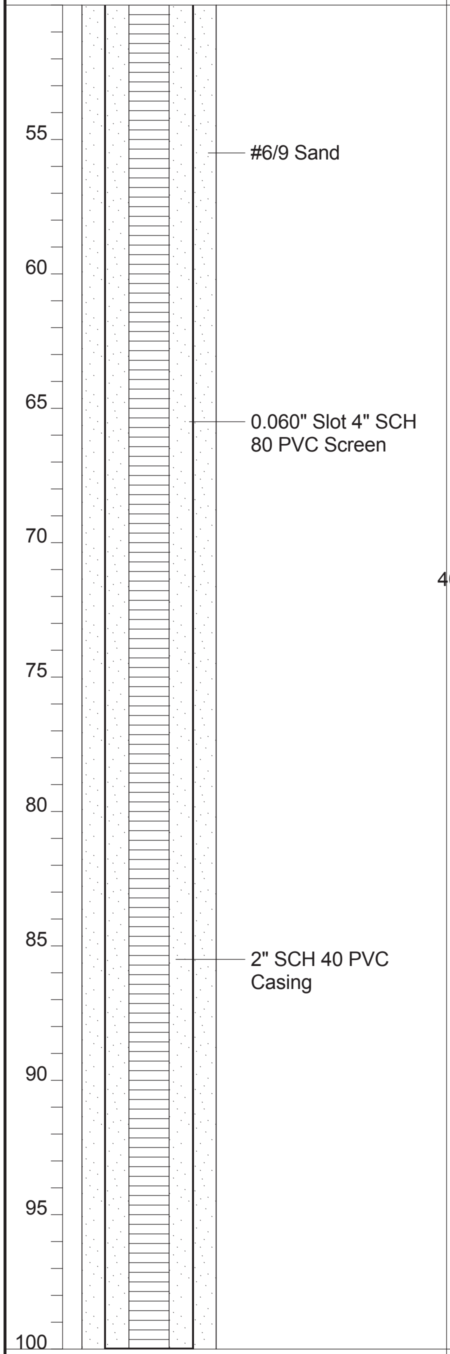
Logged by: **Nathan Haws**

Land Surf. Elev:

Meas. Pt. Elev:

Reviewed by: **RP**

WELL COMPLETION



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
25 60	90	49.6				LEAN CLAY; Reddish brown (5YR 5/4); fine sand; high plasticity; moist.	CL	0	5	95	M
27 34	100	349.5		60		LEAN CLAY; Reddish brown (5YR 5/4); well graded sand; high plasticity; wet.	CL	0	10	90	W
27 40/12"	100	66.0		70		LEAN CLAY; Reddish brown (5YR 5/4); fine sand; high plasticity;wet.	CL	0	5	95	W
N/A	0	N/A		80		WELL GRADED GRAVEL WITH SAND; (5YR 5/4).	GW	70	30	0	M
N/A	0	N/A		90		WELL GRADED SAND WITH GRAVEL; (5YR 5/4).	SW	50	50	0	M

Depth - FT.: 55, 60, 65, 70, 75, 80, 85, 90, 95, 100

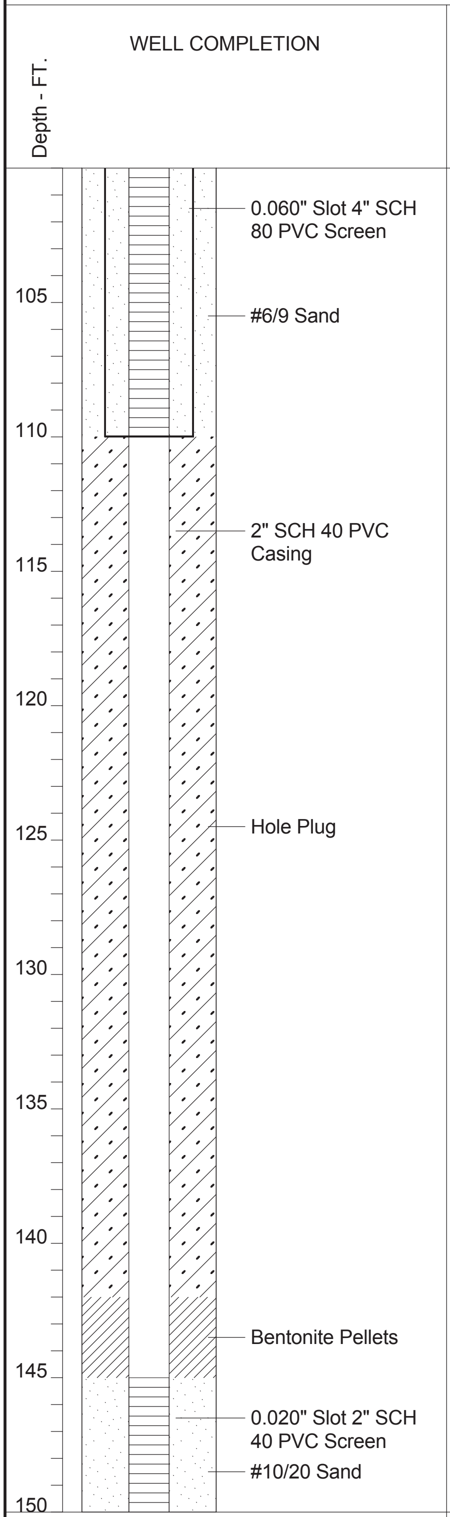
HYDRO GEO CHEM, INC.

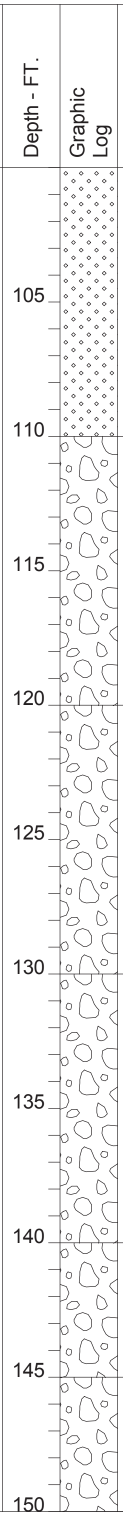
Lithologic Log and Well Construction Details of AS/SVE-102

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	2b

Project: COOPER AND COMMERCE WQARF SITE
Boring: **AS/SVE-102**
Pg. 3 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/18/06**
Location:
Sampler:
Date Completed: **4/20/06**
Desc. of Meas Pt:
Logged by: **Nathan Haws**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**





Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
N/A	0	N/A		WELL GRADED SAND WITH GRAVEL; (5YR 5/4).	SW	50	50	0	M
N/A	0	N/A		WELL GRADED GRAVEL WITH SAND; (5YR 5/4).	GW	85	15	0	M
N/A	0	N/A		WELL GRADED GRAVEL WITH SAND; (5YR 5/4).	GW	85	15	0	M
N/A	0	N/A		WELL GRADED GRAVEL WITH SAND; (5YR 5/4).	GW	80	20	0	M
N/A	0	N/A		WELL GRADED GRAVEL WITH SAND; (5YR 5/4).	GW	75	25	0	M
N/A	0	N/A		WELL GRADED GRAVEL WITH SAND; (5YR 5/4); coarse sand.	GW	60	40	0	M

Lithologic Log and Well Construction Details of AS/SVE-102

HYDRO GEO CHEM, INC.

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	2c

Appendix C

Correspondence Regarding Vapor Well (VW104)

APPENDIX C

HYDRO-SEARCH, INC.
A Tetra Tech Company

4636 East University Drive
Suite 145
Phoenix, AZ 85034

Telephone (602) 894-2800
Facsimile (602) 894-2828

September 26, 1994

Ms. Julie Richman, Compliance Officer
Hazardous Waste Compliance Unit
Arizona Department of Environmental Quality
3033 North Central Avenue
Phoenix, AZ 85012

Re: Drywell Boring
Unichem Site, Gilbert, AZ

Dear Ms. Richman:

As you are aware, we are planning to drill the drywell boring at the subject site beginning tomorrow. This will be accomplished using level B protective equipment due to the high levels of PCE encountered when we initially attempted the boring last Friday. Because high levels of PCE exist at this location, we anticipate that remediation of the drywell will include vapor extraction and treatment as a first phase to remove PCE prior to any excavation to remove cyanide contaminated soil. By following this procedure the need to excavate using level B protective gear would be eliminated.

We therefore request an amendment to the Site Assesssment Plan to allow installation of 4-inch diameter PVC screen and casing in the drywell boring to a depth of approximately 100 feet. We also request that the boring be terminated at 100 feet. Based on our experience with the first two borings at the site, we do not anticipate retrieval of valid samples at the deeper levels. Installing the vapor extraction well to a depth less than 100 feet will allow us to procede without obtaining an additional permit from DWR which would greatly delay progress. The vapor extraction well would not be used until an approved remediation plan for the drywell was in place.

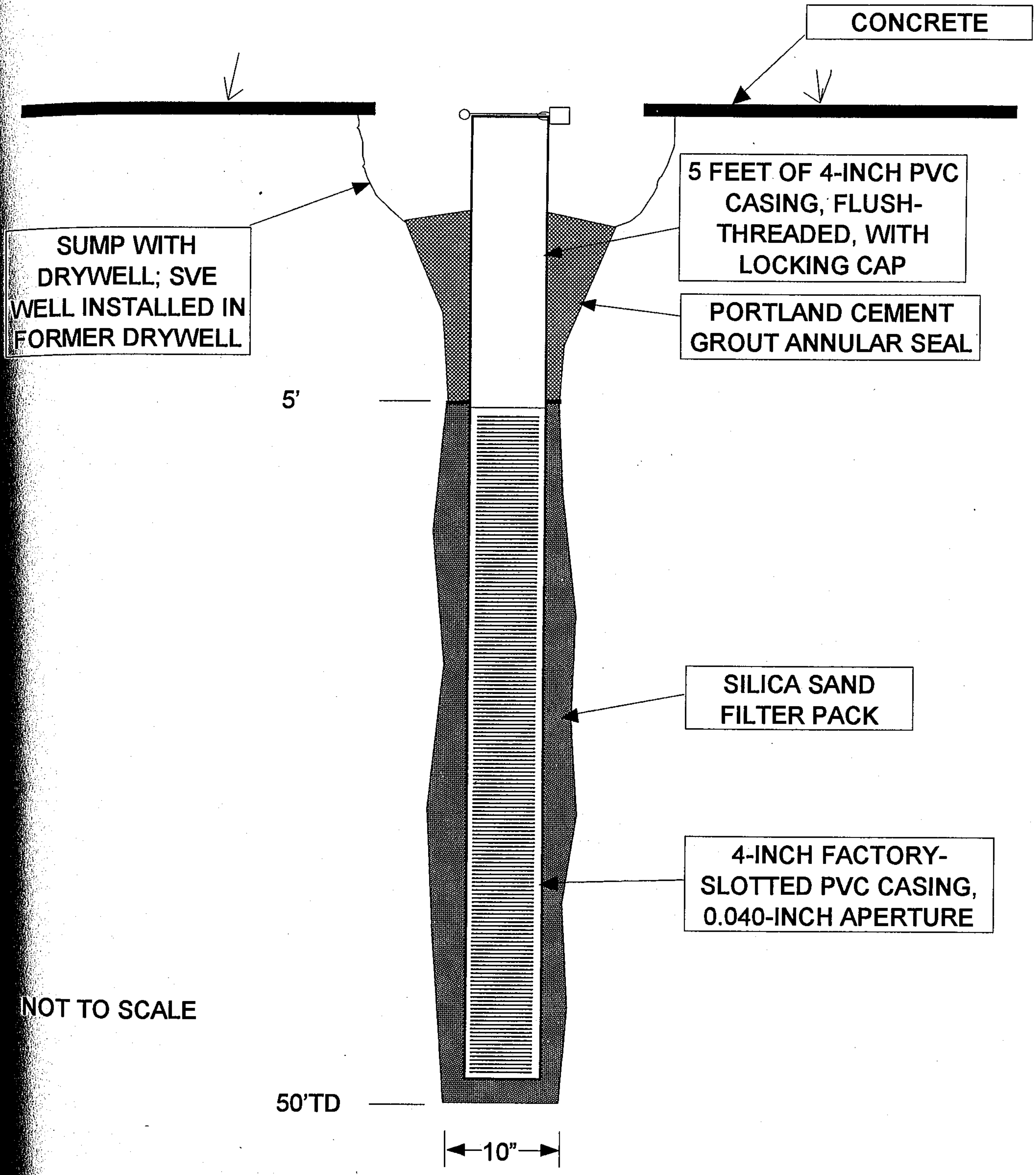
At this time we also wish to confirm a verbal amendment to the SAP made in the field to permit sampling of monitor well borings at 10-foot intervals rather than 5-foot intervals at some locations. If you do not respond we will assume this verbal amendment is approved.

We will appreciate your immediate response to the request concerning the drywell vapor extraction well so that we may proceed with installation upon completion of the boring.

For Hydro-Search, Inc.

Howard A Gustafson

Howard A. Gustafson, P.E.

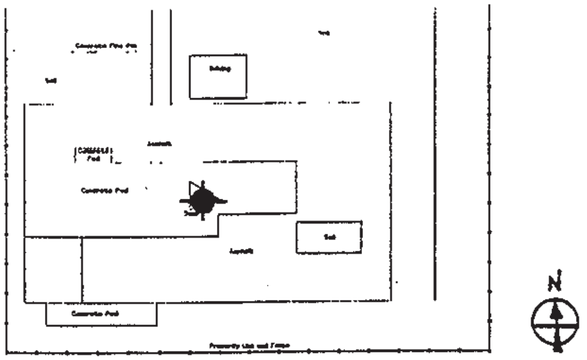


SOIL VAPOR WELL FOR UNICHEM SITE

APPENDIX C

HYDRO-SEARCH INC.

LOCATION OF BORING



JOB NO.	806568033
CLIENT	Simon - NM
LOCATION	GILBERT
BORING NO.	VW 104
SHEET	1 of 3
DRILLING METHOD:	
SAMPLING METHOD:	
DRILLING START TIME	
DRILLING FINISH TIME	
DATE (START)	
DATE (FINISH)	
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	
DATUM	
ELEVATION	
SURFACE CONDITIONS:	

DRILLING CONTR. Boyles Bros.

BY

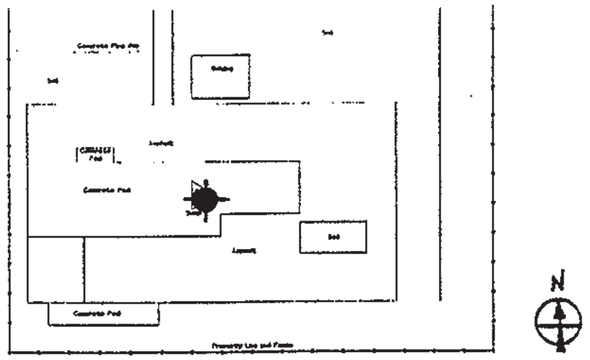
DATE

CHK'D BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
								* GRAVELS WITH SAND AND SILT 0' to 40' IMPORTED MATERIALS / DRYWELL DRAINAGE CHAMBER
							GP	
					NS			SANDY GRAVEL; BLACK GRANULAR MATERIAL THROUGHOUT SLUDGE AS THICK BLACK RESIDUE; MOIST TO VERY MOIST; POOR SAMPLE RECOVERY
				10/20/11	NS	10		GRAVEL; NO SAMPLE RECOVERED
				11/10/11	NS			SANDY GRAVEL; POOR SAMPLE RECOVERY
					NS	20		SANDY GRAVEL; POOR SAMPLE RECOVERY
							GP	
				8/16/20(5)	NS	30		SAND WITH GRAVEL TO GRAVELLY SAND; POOR SAMPLE RECOVERY
				12/13	NS	40		GRAVEL WITH SAND; SOME FINES; POOR SAMPLE RECOVERY

HYDRO-SEARCH INC.

LOCATION OF BORING



JOB NO.	CLIENT	LOCATION
806568033	SIMON - NM	GILBERT

BORING NO. VW104

SHEET 2 OF 3

DRILLING METHOD:

SAMPLING METHOD:

DRILLING START TIME / FINISH TIME

DATE / DATE

WATER LEVEL

TIME

DATE

CASING DEPTH

DATUM

ELEVATION

SURFACE CONDITIONS:

DRILLING CONTR. BOYLES BROS.

BY BJS

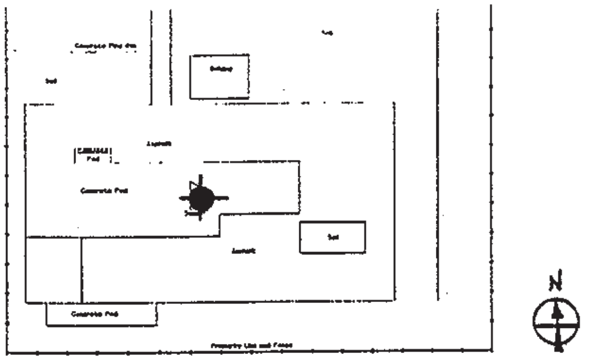
CHK'D BY

DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO. / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							GP	* GRAVELS WITH SAND AND SILT 0' TO 40' IMPORTED MATERIALS / DRY WELL DRAINAGE CHAMBER
				2/2/4	9954+	50	HSI ADEQ	CLAY TO SILTY CLAY WITH SOME GRAVEL; RED-BROWN; COHESIVE; WET; NATIVE SOIL; GOOD SAMPLE RECOVERY
							ML	
				5/6/20	5422+		ADEQ HSI	SILTY CLAY TO CLAY WITH SOME CALICHE PEBBLES; SEMI-MOIST TO DRY
					30,000+	60	ADEQ HSI	CLAY WITH SILT AND SAND; LITTLE GRAVEL; SEMI-COHESIVE TO COHESIVE; MOIST; GREEN MINERALIZATION (REDUCING CHEMICAL ENVIRONMENT)
				6/6/12	2153			CLAYEY SILT; BROWN; SEMI-COHESIVE; MOIST; DIESEL-LIKE ODOR
							ML	
						70	HSI ADEQ	CLAY WITH SILT; BROWN; SEMI-COHESIVE TO COHESIVE; DIESEL ODOR
							GW	
				4/50(3)	MAX	80		GRAVEL WITH SOME SAND; DRY; POOR SAMPLE RECOVERY

HYDRO-SEARCH INC.

LOCATION OF BORING



JOB NO. 806568033

CLIENT Simon - NM

LOCATION Gilbert

BORING NO. VW 104

SHEET 3 OF 3

DRILLING METHOD:

SAMPLING METHOD:

DRILLING START TIME FINISH TIME

DATE DATE

WATER LEVEL

TIME

DATE

CASING DEPTH

DATUM

ELEVATION

DRILLING CONTR. Boyles Bros.

BY DBS DATE CHK'D BY

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED		SAMPLE NO / SAMPLE DEPTH	BLOWS	PID	DEPTH IN FEET	SOIL GRAPH	
							GW	
								GRAVEL - SUPPORTED SAND; POOR SAMPLE RECOVERY
				14/50(5)	N/A	90		
								GRAVEL WITH COBBLE CLASTS; NO SAMPLE RECOVERED
				23/50(0)	N/A		TD99'	
						100		

HYDRO GEO CHEM, INC.

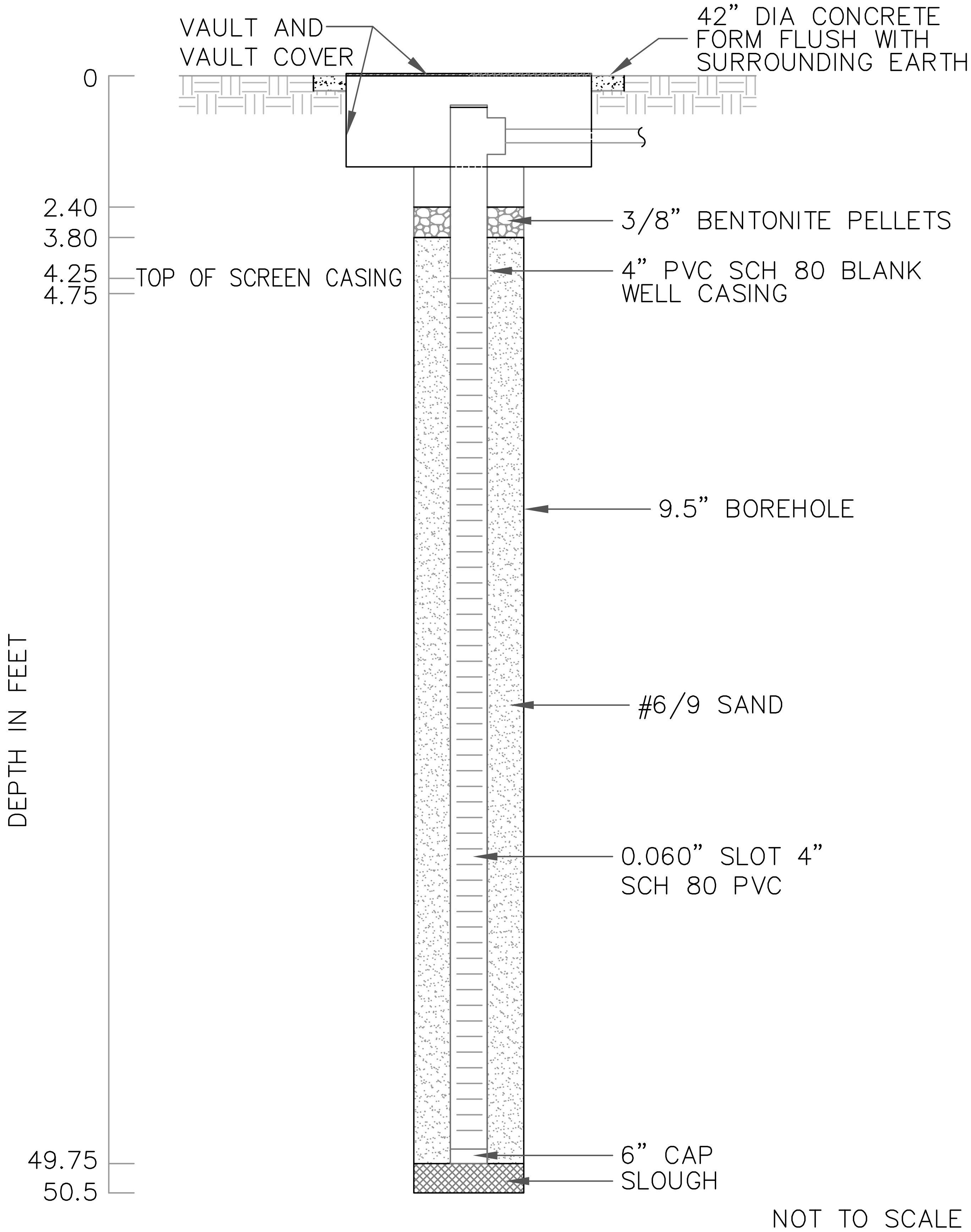
Geologic Boring Log

Boring No.: **SVE-105**
Project Name: **Cooper & Commerce SVE-105 Install**
Drilling Company: GeoMechanics SW, Inc. (GSI)
Driller: Steve Lara

Site Plan at Boring Location:
Adj to the SEC of facility fueling area/containment

ADWR Registration No.: N/A
Drilling Equipment: L-12
Drilling Method: Hollow-Stem Auger
Bit Type/Size: 6.25 inch I.D; 9.5-inch O.D.
Total Borehole Depth: 50.5 ft bgs
Casing Depth: 49.75 ft bgs
Screened Interval: 49.25 - 4.75 ft bgs
Screen slot size: 0.060 ins
Filter pack type: #6-9 sand
Top of Casing Elevation: 0.5 in bgs (modified to connect)
Land surface Elevation: N/A
Drilling Started: 11-15-10/ 8:45 am
Drilling Completed: 11-15-10/ 12:45 pm
Logged by: Neil J. Babb, G.I.T.
Lattitude:
Longitude:
Checked by: Chris Jacquemin, P.E.

Depth (Ft)	Blow Counts	Estimated %			USCS Symbol	Munsell Color	PID ppm	Sample Description
		GR	SA	FI				
0								A/B Gravel surface.
	N/A					5 YR 4/4		**WELL GRADED SAND w/SILT:** dry, non-plasticity; well graded
	Grab-	<5	85	<5	SW-SM	Reddish-	2.6	very fine to coarse sands w/little silty fines and trace fine gravel
	Sample					Brown		(max size 5mm, sub-rounded to sub-angular); low dry strength,
								no cohesiveness.
5	17,24,32	70	10	20	SW-SM	5 YR 4/6	3.3	**WELL GRADED SAND w/SILT:** dry, non-plasticity; well graded
						yellowish-		very fine to coarse sands w/little silty fines and trace fine gravel
	100%					red		(max size 1in, sub-rounded to angular); low dry strength, no
	recovery							cohesiveness; med dense to dense density; trace amts of
								white mottling fragments
10	18, 32	0	<10	90	ML	5 YR 4/6	0.6	**SILT:** dry, no to low plasticity; mostly poorly graded silt w/ trace
	50/6					yellowish-		amts of clay and little sand fraction (mostly fine-grained); low
	85%					red		dry strength, no to low toughness; very stiff to hard consistency.
	recovery							
20	35, 36	0	<10	90	ML	5 YR 5/3	21.5	**SILT:** dry, low plasticity; mostly poorly graded silt w/ trace amts
	50/4					reddish-		clay and little sand fraction (mostly fine-grained); low cohesive-
	80%					brown		ness, low dry strength, low toughness; very stiff to hard consis-
	recovery							tency; note driller stated formation was getting very tight, need-
								ed to add water to boring (approx 10-gals).
30	32, 25	0	5	95	CL	7.5 YR 6/3	27.8	**LEAN CLAY:** dry, med plasticity; poorly graded, approx 75% clay,
	50/5					Lt. brown		25% silt, and trace amt of fine-grained sand; low to med dry
	80%							strength, cohesive; very stiff to hard consistency; note driller
	recovery							added approx 5-gals of water at 39 ft bgs.
40	50/6	0	10	90	CL-ML	7.5 YR 7/2	37.9	**LEAN CLAY to SILT:** dry, low to med plasticity; poorly graded
						pinkish-		clay (approx 55%) and silt (35%) w/little fine-grained sand
	35%					gray		fraction; med to high dry strength, low to med toughness;
	recovery							cohesive; moderate cementation; hard consistency.
50	34, 50/6	0	10	90	ML	7.5 YR 5/3	8.5	**SILT:** dry, no to low plasticity; mostly poorly graded silt (85%)
						brown		w/trace amt of clay and little fine to med grained sand; low dry
	60%							strength; no to low toughness; very stiff to hard consistency.
	recovery							
50.5	**T.D.**	-	-	-	--------	----------	-	**Total Depth of Boring**



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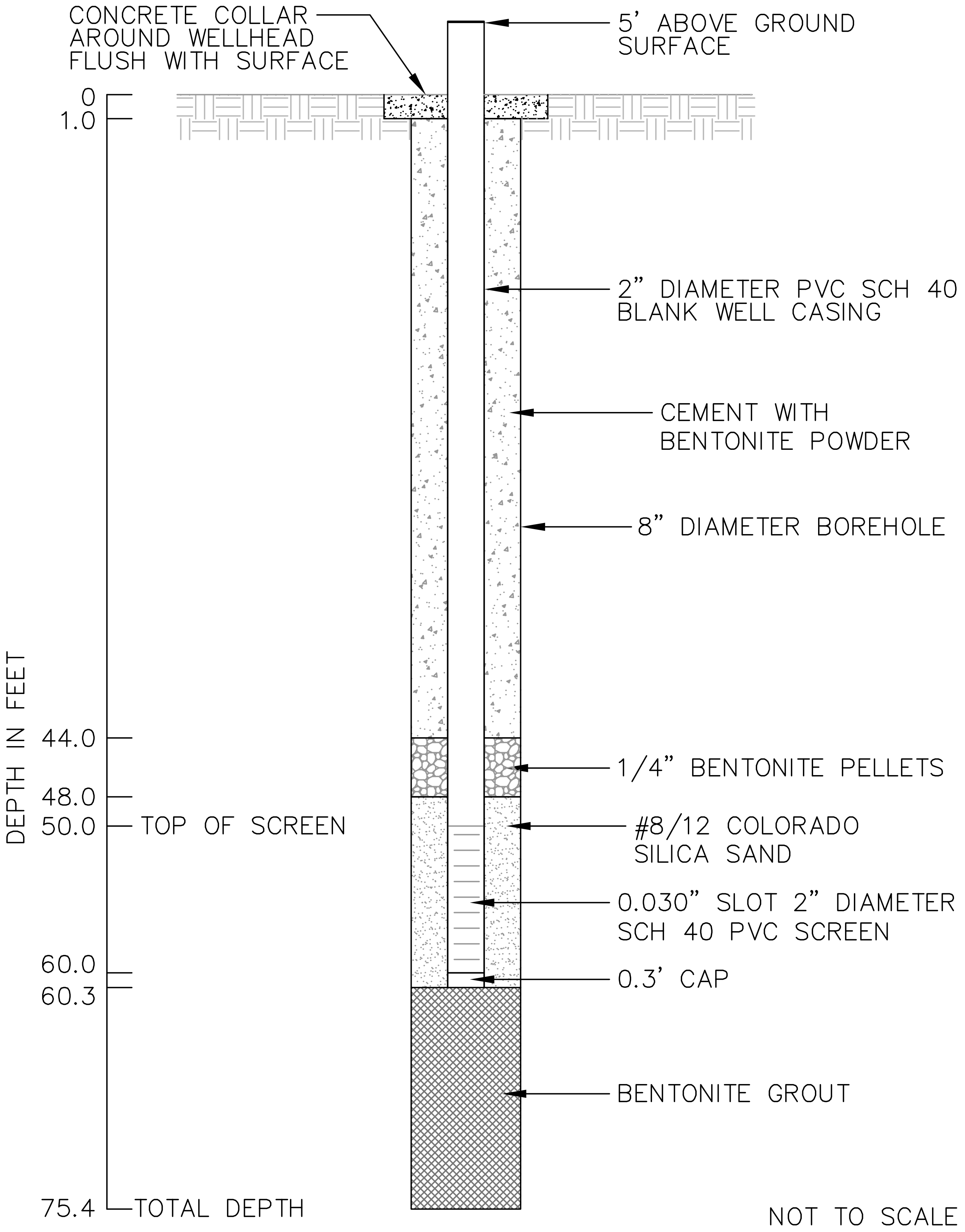
SOIL VAPOR EXTRACTION WELL (SVE-105)
ADWR NO. 55-211538

Approved	Date	Author	Date	File Name	Figure
CLJ	4/5/11	JAA	4/5/11	2010002010A	3



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SVE-106
CONSTRUCTION DIAGRAM

Approved	Date	Author	Date	File Name	Figure
CLJ	**6/18/12**	**JAA**	**6/18/12**	**2010002033A**	**1**

HYDRO GEO CHEM, INC.

Geologic Boring Log

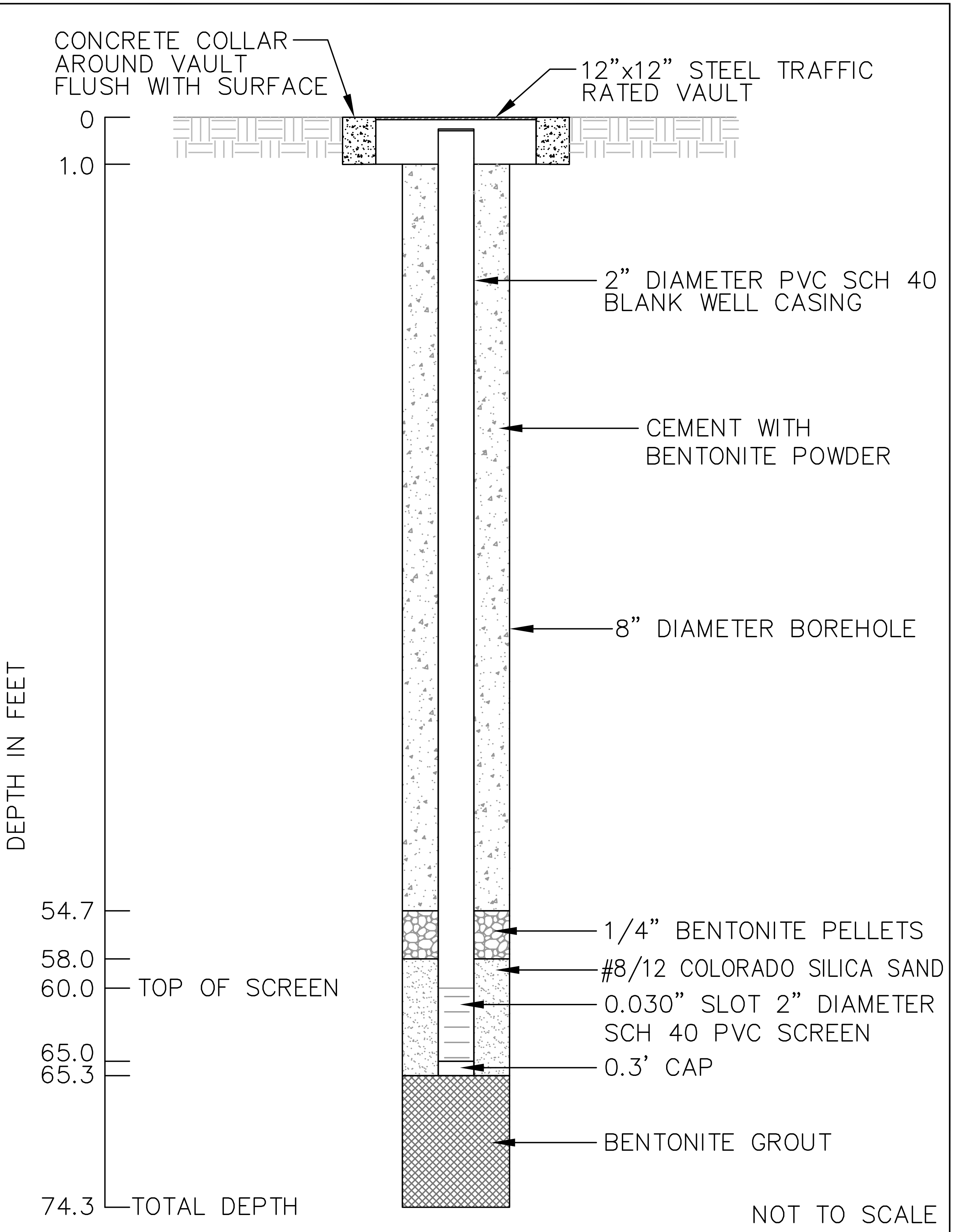
Sheet 1 of 2

Project Name: Cooper & Commerce WQARF Site, VP-104 Exploratory Drilling
Boring No.: B-1W (SVE-106)
Drilling Company: Geomechanics SW, Inc.
Driller: Mike Shelquist
Proj No.: 2010002.04, T9.1
Site Plan at Boring Location: approx 3 ft west of VP-104 inside SVE-compound
Drilling Equipment: CME-95
Drilling Method: Hollow-Stem Auger
Bit Type: 5-tooth shoe Size: 4.25 ins I.D.
Started, Time: 9:00 am Date: 6-4-12
Completed, Time: 9:30 am Date: 6-5-12
Total Boring Depth: 73.5 ft bgs
Boring Diameter: 8 inches
Well Casing Depth: 60.3 ft bgs
Screened Interval: 50-60 ft bgs
Well Diameter: 2 inches
Logged By: Neil J. Babb, G.I.T.
Checked By: Chris Jacquemin, P.E., BCEE

Samp Time	Depth (Ft)	Moisture	BCs & Recovery	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Sample Description
				GR	SA	FI				
9:45	0									Approx 4-inch thick concrete-pad
	2									
	4									
	6									
	8									
10:05	10	Dry	4, 7, 8	0	90	10	SW-SC	7.5YR 5/6	10.3	**WELL GRADED SAND W/CLAY:** non-plastic, no
	12		100%					Strong-		cohesive, fine to coarse-grained sand w/clayey fines
	14		Recovery					Brown		intermixed; very loose to loose density; obtained
	16									summa & soil-samples
	18									
11:10	20	Dry	14, 39, 50/5	0	75	25	SC	7.5YR 4/6	15.9	**CLAYEY SAND:** low plasticity, cohesive (driller
	22		100%					Brown &		stated formation was tight), fine to coarse-grained
	24		Recovery					7.5YR 5/8		sands mottled w/pink-white precipitate (7.5 YR 8/2),
	26							Brown w/		intermixed w/clayey fines; med dry strength, med to
	28							mottling		dense density; obtained summa & soil samples.
12:10	30	Dry	11, 33, 30	0	25	75	ML	7.5YR 5/4	13.3	**SILT W/SAND:** no to low plasticity, non-cohesive,
	32		100%					Brown w/		mostly silty fines w/ fine to coarse-grained sands
	34		Recovery					1 Gley 7/2		intermixed; stiff to hard consistency; obtained
	36							Pale-green		summa & soil-samples
	38									
13:25	40	Moist	2, 4, 4	0	10	90	CL	7.5YR 5/4	15.2	**LEAN CLAY:** high plasticity, cohesive, sample in
	42		100%					Brown		sleeve was moist; medium pressure to make 2mm
	44		Recovery							roll; high dry strength (unable to break dry specimen
	46									w/fingers; very soft to soft consistency; obtained
	48									summa & soil-samples

Project Name: Cooper & Commerce SV Project No.: 2010002.10, Boring No.: B-1W (SVE-106) Sheet 2 of 2

Sample Time	Depth (Ft)	Mois-ture	BCs & Recovery	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Logged By/Date: NJ. Babb, G.I.T/ 6 - 4 & 5 - 12
				GR	SA	FI				Checked By/Date: Chris Jacquemin, P.E., BCEE
14:35	50	Dry to	3, 3, 4	0	15	85	CL	7.5YR 4/6	10.5	**LEAN CLAY:** medium plasticity, cohesive, very
	52	moist	100%					Strong		similar to 40 ft bgs interval sample but a little drier
	54		Recovery					Brown		and sands fraction slightly increased, mostly fine to
	56									coarse-grained; soft consistency; obtained summa
	58									and soil samples
7:10	60	Dry	25, 21, 44	5	55	40	SC	7.5YR 5/4	69.8	**CLAYEY SAND:** low to medium plasticity, cohesive,
	62		100%					Brown w/		high dry strength; note soil retrieved inside sleeve
	64		Recovery					1 Gley 5/2		also mottled w/olive-yellow (2.5 Y 6/8) & white pre-
	66							grayish-		cipitate; sweet chemical odor present; sands fine to
	68							green		coarse-grained; med to dense density; samples.
8:45	70	Dry to	5, 8, 9	0	60	40	SM	7.5YR 4/4	276	**SILTY SAND:** no to low plasticity, low cohesive,
		Moist	100%					Brown		poorly-graded sand (fine to med-grained) w/mostly
			Recovery							silty fines; sweet-chemical odor has increased; zip-
										loc pid reading registered much higher than from
										purge-tubing reading (1638.9 ppm); obtained summa
										soil samples w/dup; loose density.
9:15	73	Dry	15, 11, 43	0	60	40	SM	7.5YR 4/4	67.8	**SILTY SAND:** basically same as above, advanced
								Brown		sampler to locate transition from fine-grained sedi-
	73.5	*****	********	Total Depth of Boring						ments to the coarser-grained sands & gravels zone;
										med dense to dense density.
	75.2	****	*******	25	65	10	SW		66.7	**WELL GRADED SAND W/GRAVEL:** Definitive
										lithology change identified inside retrieved spoon-
										sampler; note discoloration/staining on soil at
										transition (olive-green coloring); contains fine to
										coarse sized gravels, max 2 ins
	75.4	****	*******	****	****	****	*******	*******	****	**T.D. of Sampler Advancement**



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SVE-107
CONSTRUCTION DIAGRAM

Approved	Date	Author	Date	File Name	Figure
CLJ	**6/18/12**	**JAA**	**6/18/12**	**2010002034A**	**2**

HYDRO GEO CHEM, INC.

Geologic Boring Log

Sheet 1 of 2

Project Name: Cooper & Commerce WQARF Site, VP-104 Exploratory Drilling
Boring No.: B-3NE (SVE-107)
Drilling Company: Geomechanics SW, Inc.
Driller: Mike Shelquist
Proj No.: 2010002.04, T9.1
Site Plan at Boring Location: Approx 10 ft NE of VP-104, outside of compound
Drilling Equipment: CME-95
Drilling Method: Hollow-Stem Auger
Bit Type: 5-tooth shoe Size: 4.25-inches
Started, Time: 10:00 am Date: 6-6-12
Completed, Time: 10:15 am Date: 6-7-12
Total Boring Depth: 74.3 ft bgs
Boring Diameter: 8-inches
Well Casing Depth: 65.3 ft bgs
Screened Interval: 60-65 ft bgs
Well Casing Diameter: 2-inches
Logged By: Neil J. Babb, G.I.T.
Checked By: Chris Jacquemin, P.E., BCEE

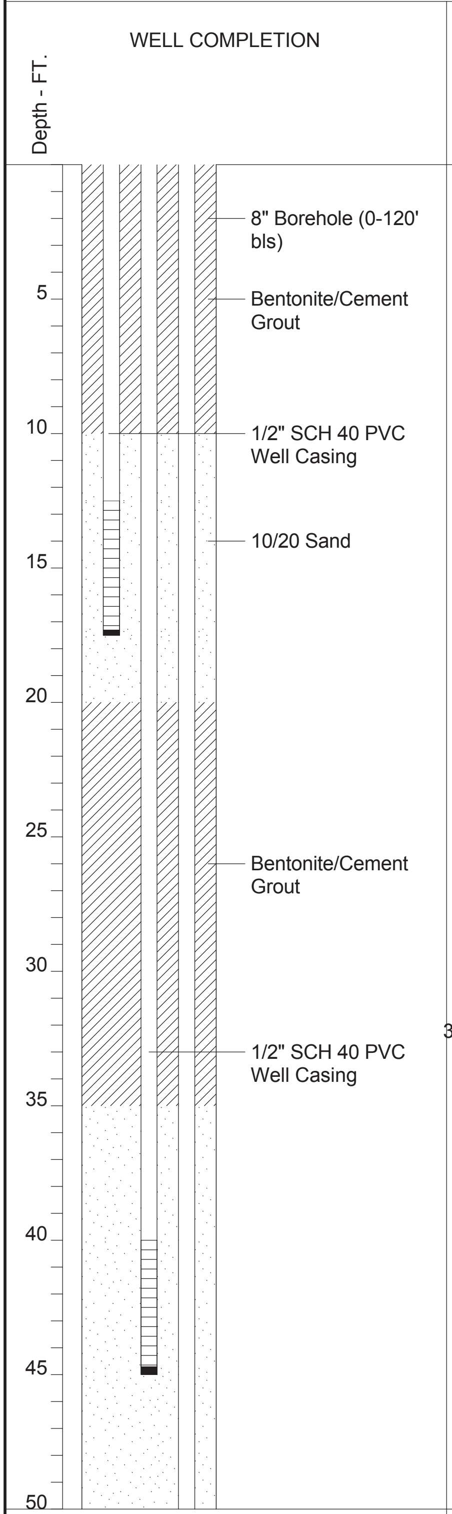
Samp Time	Depth (Ft)	Mois-ture	BCs & Recovery	Estimated %			USCS Symbol	Munsell Color	PID (ppm)	Sample Description
				GR	SA	FI				
10:15	0									Approx 8-inches A/B gravel
	2									
	4									
	6									
	8									
10:30	10	Dry	5, 7, 13	0	65	35	SM	7.5YR 5/6	5.1	**SILTY SAND:** non-plastic, non-cohesive, low dry
	12		100%					Strong-		strength; mostly well graded sands (fine to med-grained)
	14		Recovery					Brown		w/silty fines intermixed; loose to medium density; obtain-
	16									ed summa & soil-samples.
	18									
11:15	20	Dry	20, 30, 50/4	< 5	<60	40	SM	7.5 YR 5/6	4.7	**SILTY SAND:** non- plastic, non-cohesive, low to med
	22		90%					Strong-		dry strength; mostly well graded sands (fine to coarse)
	24		Recovery					Brown		w/silty fines intermixed, note considerable white precipi-
	26									tate intermixed in sample, very cemented in sleeve; med to
	28									very dense density; obtained summa & soil samples.
13:00	30	Dry	19, 30, 28	0	30	70	ML	7.5YR 4/6	3.1	**SANDY SILT:** non-plastic, non-cohesive, low to med dry
	32		100%					Strong-		strength; mostly silty fines intermixed w/poorly graded
	34		Recovery					Brown		sands (fine to medium grained); very stiff to hard consis-
	36									tency; obtained summa & soil samples.
	38									
13:55	40	Moist	4, 4, 10	<5	<20	80	CL	7.5 YR 5/6	4.1	**LEAN CLAY W/SAND:** med-high plasticity, cohesive,
	42		100%					Strong-		makes 2mm roll w/med pressure, high dry strength; mostly
	44		Recovery					Brown		clayey fines intermixed w/poorly graded sand (mostly fine
	46									w/lil medium-grained); trace sub-angular gravel (max 2mm)
	48									soft to stiff consistency; obtained summa & soil samples

Project Name: Cooper & Commerce SV Project No.: 2010002.04, T9 Boring No.: B-3NE (SVE-107) Sheet 2 of 2

Sample	Depth	Mois-	BCs &	Estimated %			USCS	Munsell	PID	Logged By/Date: NJ. Babb 6 - 6 & 7-12
Time	(Ft)	ture	Recovery	GR	SA	FI	Symbol	Color	(ppm)	Checked By/Date: Chris Jacquemin, P.E, BCEE
14:50	50	Dry-	6, 8, 10	0	35	65	CL	7.5 YR 5/6	1.2	**SANDY LEAN CLAY:** med to high plasticity, cohessive,
	52	moist	100%					Strong-		makes 2mm roll w/med-press, med to high dry strength;
	54		Recovery					Brown		mostly clayey fines intermixed w/fine to med-grained
	56									sands; also contains black mineral fragments; medium to
	58									stiff consistency; obtained summa and soil samples.
7:20	60	Dry-	6, 16, 28	0	5	95	CL	5 YR 4/4	0.5	**LEAN CLAY:** high plasticity, cohessive, makes 2mm roll
	62	moist	100%					Reddish-		w/low pressure; high to very high dry strength; predomi-
	64		Recovery					Brown		nantly clayey fines w/trace fine sand; very tight drilling,
	66									caused boring to smoke; med to very stiff consistency;
	68									obtained summa & soil samples.
8:25	70	Moist	5, 8, 12	0	15	85	CL	5 YR 4/6	2.9	**LEAN CLAY W/SAND:** med to high plasticity, cohesive,
			100%					yellowish-		makes 2mm roll w/low-press, med to high dry strength;
			Recovery					red		mostly clayey fines intermixed w/fine to med-grained
										sands; medium to stiff consistency; obtained summa &
										soil samples.
9:35	74.3	Moist	9, 10, 13	0	40	60	CL	5YR 4/6	4	**SANDY LEAN CLAY:** med to high plasticity, cohesive,
			100%					yellowish-		able to make 4mm roll w/med-pressure; med dry strength;
			Recovery					red		mostly clayey fines intermixed w/fine to med-grained
										sands w/visible qtz-grains; note orangish-yellow discolor
	74.3	*****	********	Total Depth of Boring *******						ation on sample; med to stiff consistency; obtain samples

Project: **COOPER AND COMMERCE WQARF SITE** Boring: **VP-101** Pg. 1 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/14/06**
Location:
Sampler:
Date Completed: **4/17/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
					▨	LEAN CLAY; Reddish brown clay (5YR 4/4); sand fine; high plasticity; 5% caliche; moist.					
7 24	50	1.6		10	▨	LEAN CLAY; Reddish brown clay (5YR 4/4); 10% caliche; dry.	CL	0	5	95	M
35 64	40	1.4		20	▨	LEAN CLAY; Reddish brown clay (5YR 4/4); no caliche; moist.	CL	0	5	95	D
32 35 38/3"	70	1.3		30	▨	LEAN CLAY; Reddish brown clay (5YR 4/4); no caliche; moist.	CL	0	5	95	M
6 18 25	100	1.3		40	▨	LEAN CLAY; Reddish brown clay (5YR 4/4); no caliche; moist.	CL	0	5	95	M

Depth - FT.: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

HYDRO GEO CHEM, INC.

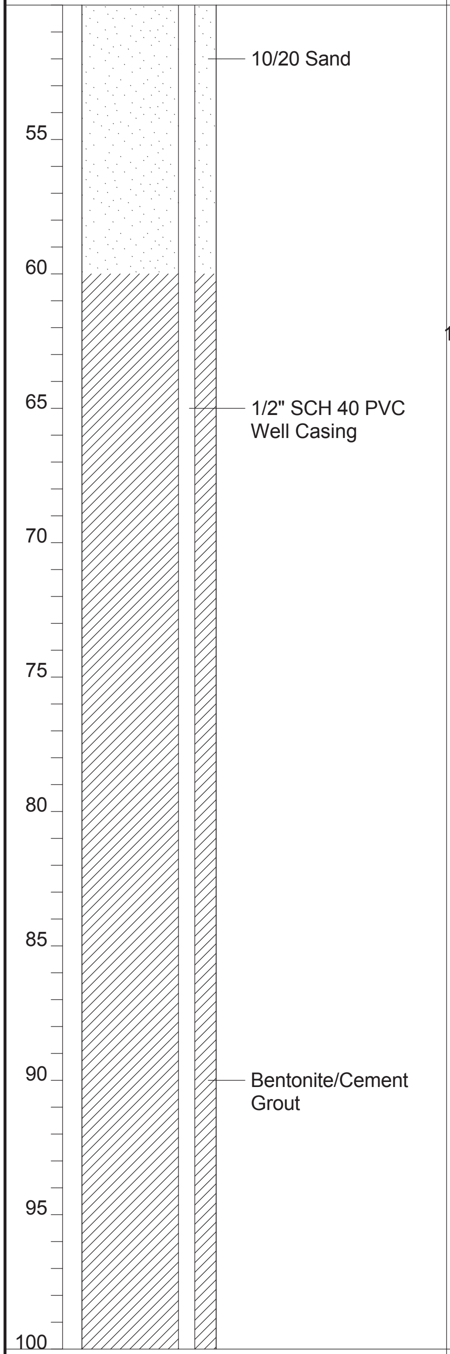
Lithologic Log and Well Construction Details of VP-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	**4a**

Project: COOPER AND COMMERCE WQARF SITE
Boring: **VP-101**
Pg. 2 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/14/06**
Location:
Sampler:
Date Completed: **4/17/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
4 11 14	100	1.3				LEAN CLAY; Reddish brown clay (5YR 4/4); 40% caliche; moist.	CL	0	5	95	M
22 25 10/3"	100	0.8		60		LEAN CLAY; Reddish brown clay (5YR 4/4); 10% caliche.	CL	0	5	95	M
N/A	0	N/A	○	70		WELL GRADED GRAVEL; Reddish brown (5YR 4/4); angular to sub angular; moist.	GW	85	10	5	M
N/A	0	N/A		80		WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4); gravel is graded to 2"; angular to sub angular; moist.	SW	45	50	5	M
N/A	0	N/A		90		WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4); gravel is graded to 2"; angular to sub angular; moist.	SW	45	50	5	M

Depth - FT.: 55, 60, 65, 70, 75, 80, 85, 90, 95, 100

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of VP-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	4b

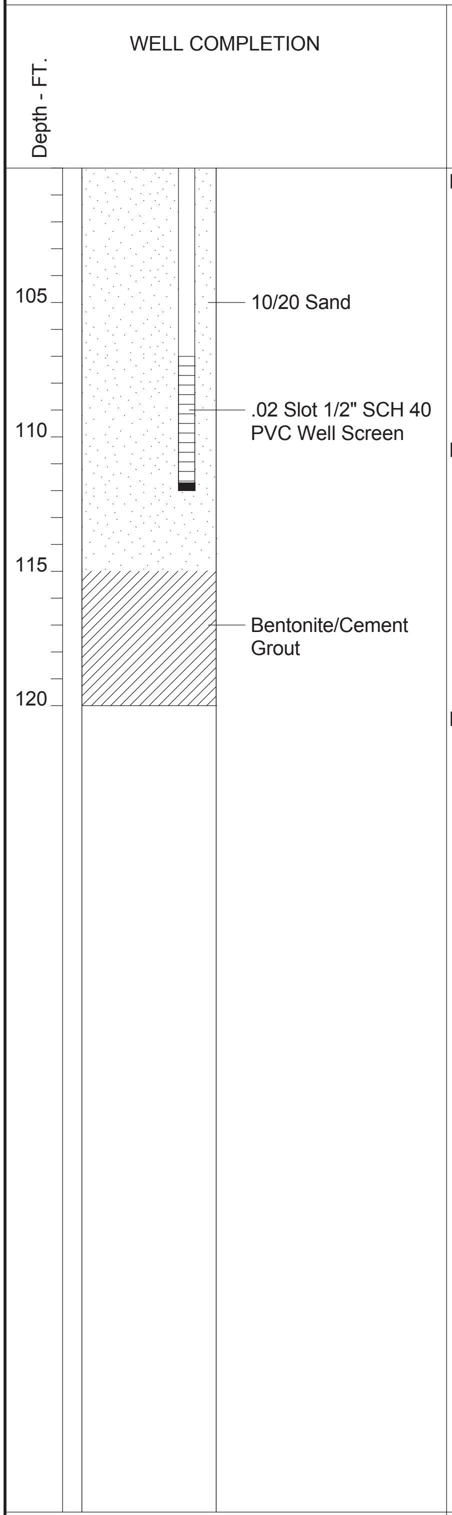
Project: COOPER AND COMMERCE WQARF SITE　Boring: **VP-101**　Pg. 3 of 3

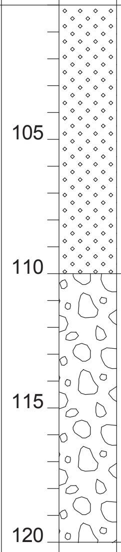
Drilling Co: **Water Development Corp.**　Drilling Method: **Air Rotary Casing Hammer**　Date Started: **4/14/06**

Location:　Sampler:　Date Completed: **4/17/06**

Desc. of Meas Pt:　Logged by: **B.Anderson**

Land Surf. Elev:　Meas. Pt. Elev:　Reviewed by: **RP**





Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	ESTIMATED % OF SA	ESTIMATED % OF FI	Moisture
N/A	0	N/A				WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4); gravel is graded to 2"; angular to sub angular; moist.	SW	45	50	5	M
N/A	0	N/A				WELL GRADED GRAVEL; Reddish brown (5YR 4/4); gravel graded to 2"; angualr to sub angular; moist.	GW	85	10	5	M
N/A	0	N/A				WELL GRADED SAND; Reddish brown (5YR 4/4); gravel well graded to 2"; angular to sub angular.	SW	45	50	5	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of VP-101

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	4c

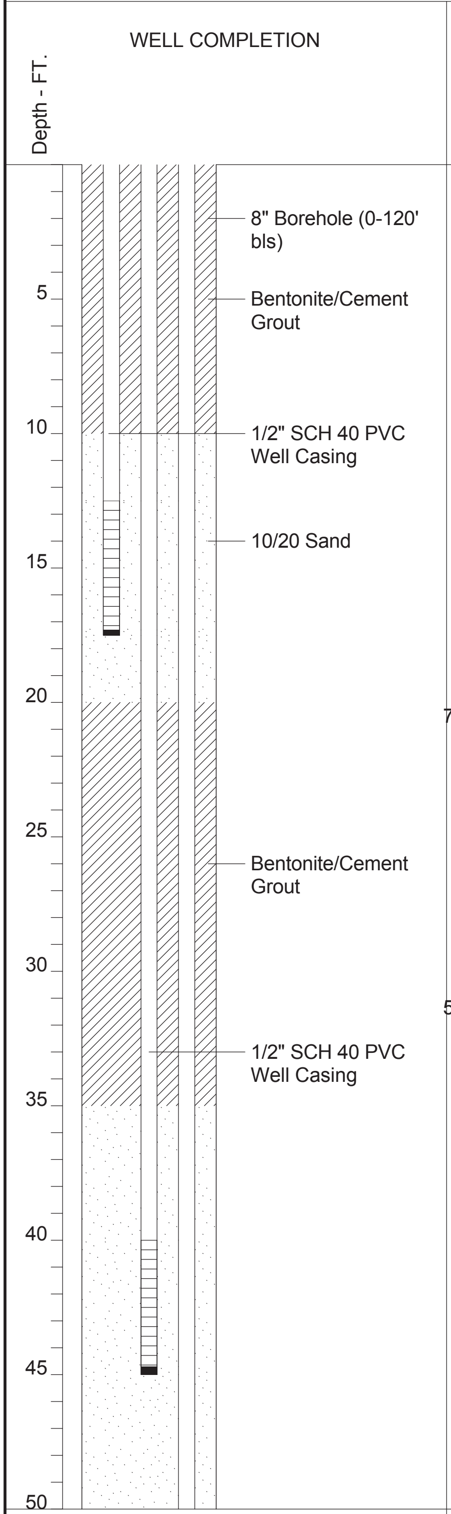
Project: COOPER AND COMMERCE WQARF SITE Boring: **VP-102** Pg. 1 of 3

Drilling Co: **Water Development Corp.** Drilling Method: **Air Rotary Casing Hammer** Date Started: **4/4/06**

Location: Sampler: Date Completed: **4/6/06**

Desc. of Meas Pt: Logged by: **B.Anderson**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **RP**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
36 35 32	100	3.4		10		LEAN CLAY; Reddish brown (5YR 4/4); sand poorly graded-fine only; high placticity; dry.	CL	0	5	95	D
76/6"	30	0.3		20		LEAN CLAY; Reddish brown (5YR 4/4); sand poorly graded-fine only; high placticity; 5% caliche with nodes to 3/8 inch; dry.	CL	0	5	95	D
20 50/6"	60	2.0		30		LEAN CLAY; Reddish brown (5YR 4/4); sand poorly graded-fine only; high placticity; 5% caliche with nodes to 3/8 inch; dry.	CL	0	5	95	D
8 13	100	18.0		40		NOTES UNCLEAR	SC	15	5	80	M

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Lithologic Log and Well Construction Details of VP-102

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	5a

HGC-WELL2 833000.GPJ NEWPROJ.GDT 8/10/06

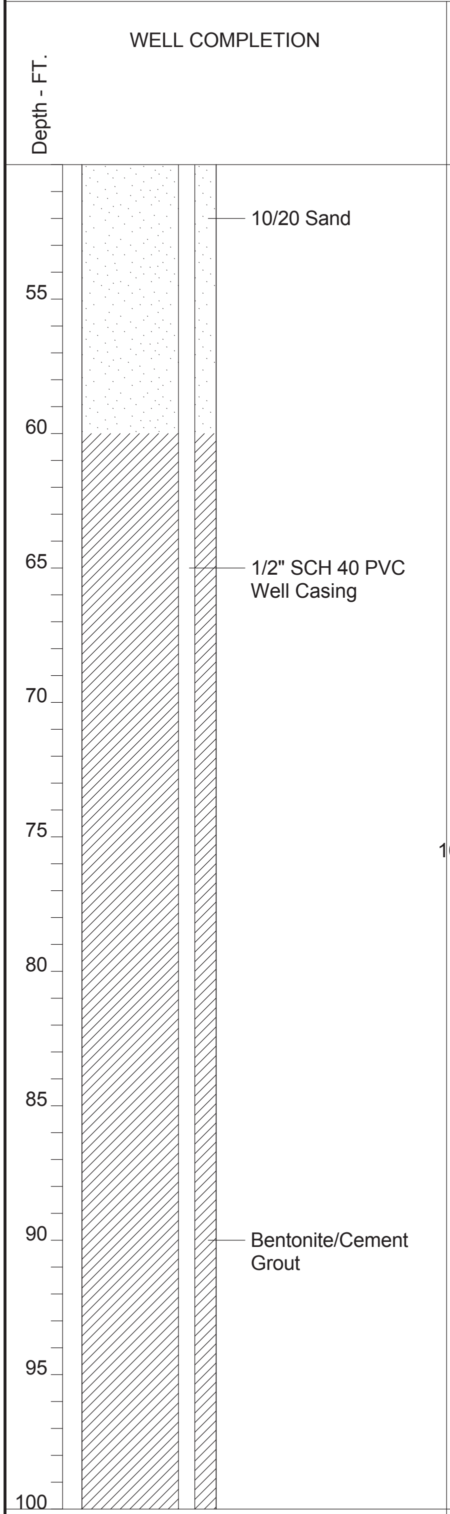
Project: COOPER AND COMMERCE WQARF SITE Boring: **VP-102** Pg. 2 of 3

Drilling Co: **Water Development Corp.** Drilling Method: **Air Rotary Casing Hammer** Date Started: **4/4/06**

Location: Sampler: Date Completed: **4/6/06**

Desc. of Meas Pt: Logged by: **B.Anderson**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **RP**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
2 6 12	100	28.5			▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; caliche nodes to 1/2 inch; high plasticity; moist.	CL	0	5	95	M
12 13 24	100	117		60	▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 5%caliche with nodes to 1/4 inch; high plasticity; moist.	CL	0	5	95	M
8 24	100	218		70	▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; no caliche; high plasticity; moist.	CL	0	10	90	M
100/3"	0	N/A		75		WELL GRADED GRAVEL; Reddish brown (5YR 4/3).	GW	85	10	5	M
N/A	0	N/A		80		WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4).	SW	45	50	5	M
N/A	0	N/A		90		WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4).	SW	45	50	5	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of VP-102

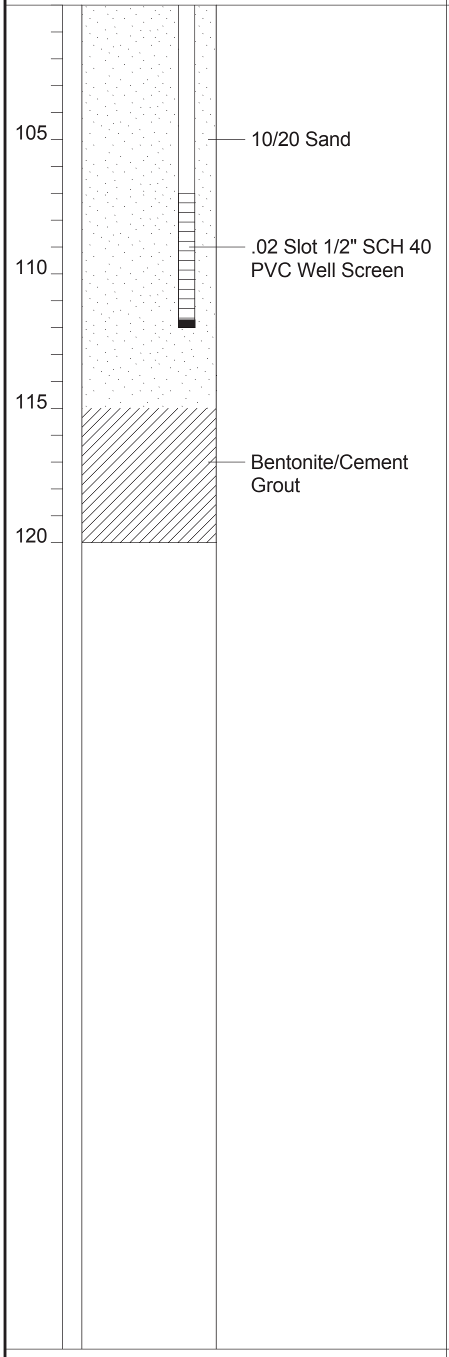
Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	5b

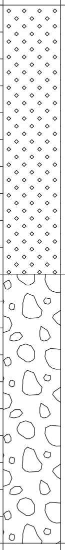
HGC-WELL2 833000.GPJ NEWPROJ.GDT 8/10/06

Project: COOPER AND COMMERCE WQARF SITE
Boring: **VP-102**
Pg. 3 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/4/06**
Location:
Sampler:
Date Completed: **4/6/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION





Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
N/A	0	N/A				WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4).	SW	45	50	5	M
N/A	0	N/A		110		WELL GRADED GRAVEL; Reddish brown (5YR 4/4); angular to sub angular; moist.	GW	85	10	5	M
N/A	0	N/A		120		WELL GRADED SAND WITH GRAVEL; Reddish brown (5yr 4/4); angular to sub angular.	SW	50	45	5	M

HYDRO GEO CHEM, INC.

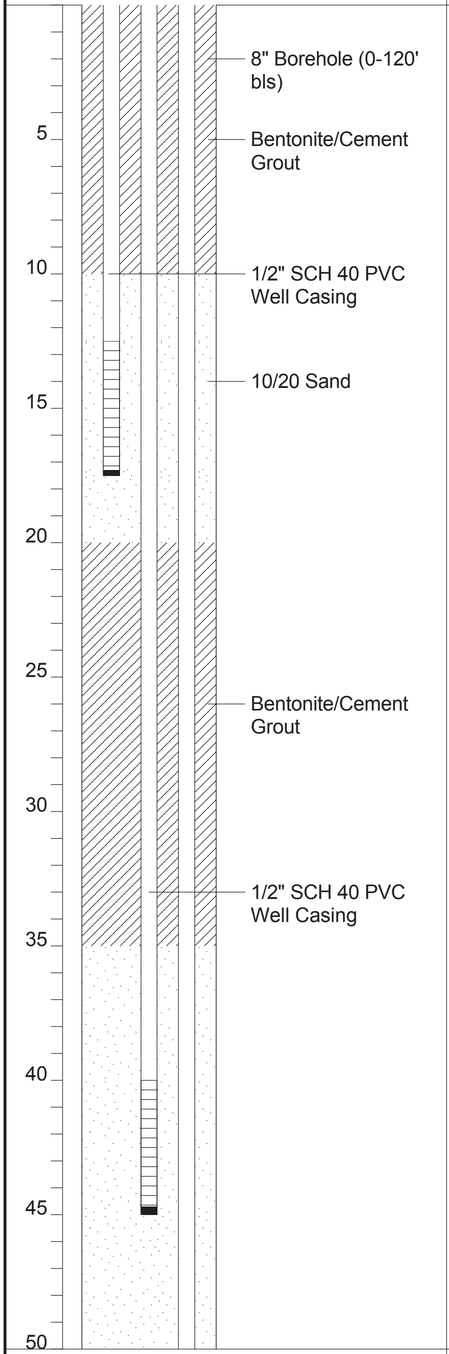
Lithologic Log and Well Construction Details of VP-102

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	5c

Project: COOPER AND COMMERCE WQARF SITE
Boring: **VP-103**
Pg. 1 of 3

Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/10/06**
Location:
Sampler:
Date Completed: **4/11/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
				5							
11 20	50	7.8		10		LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; dry.	CL	0	5	95	D
				15							
25 119	50	3.3		20		LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; dry.	CL	0	5	95	D
				25							
25 75	60	3.1		30		LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 10% caliche; high plasticity; dry.	CL	0	5	95	D
				35							
13 42	50	15.5		40		LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; moist.	CL	0	5	95	M
				45							
				50							

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of VP-103

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	6a

Project: COOPER AND COMMERCE WQARF SITE Boring: **VP-103** Pg. 2 of 3

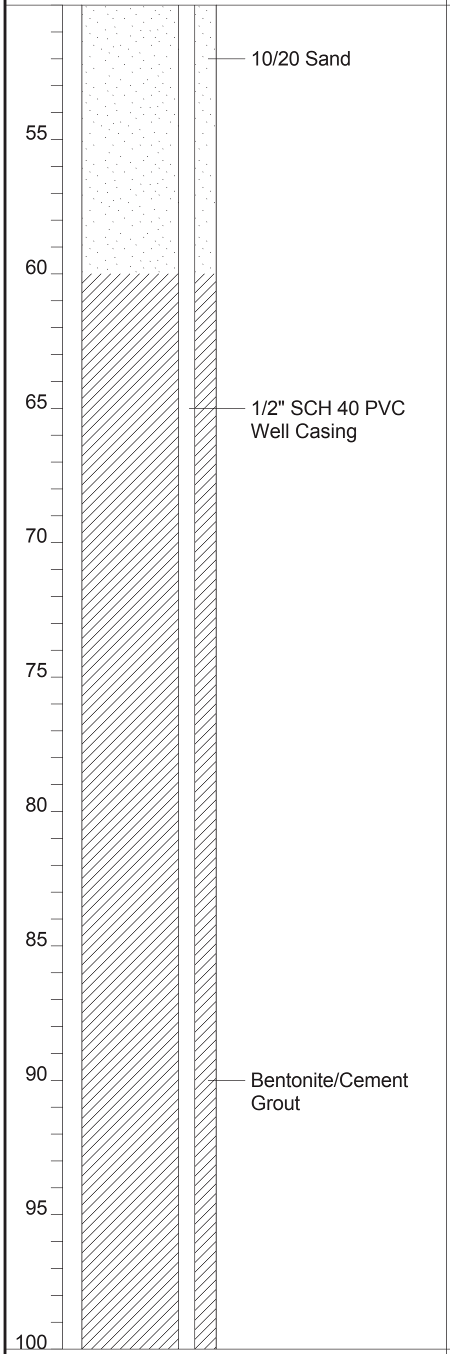
Drilling Co: **Water Development Corp.** Drilling Method: **Air Rotary Casing Hammer** Date Started: **4/10/06**

Location: Sampler: Date Completed: **4/11/06**

Desc. of Meas Pt: Logged by: **B.Anderson**

Land Surf. Elev: Meas. Pt. Elev: Reviewed by: **RP**

WELL COMPLETION



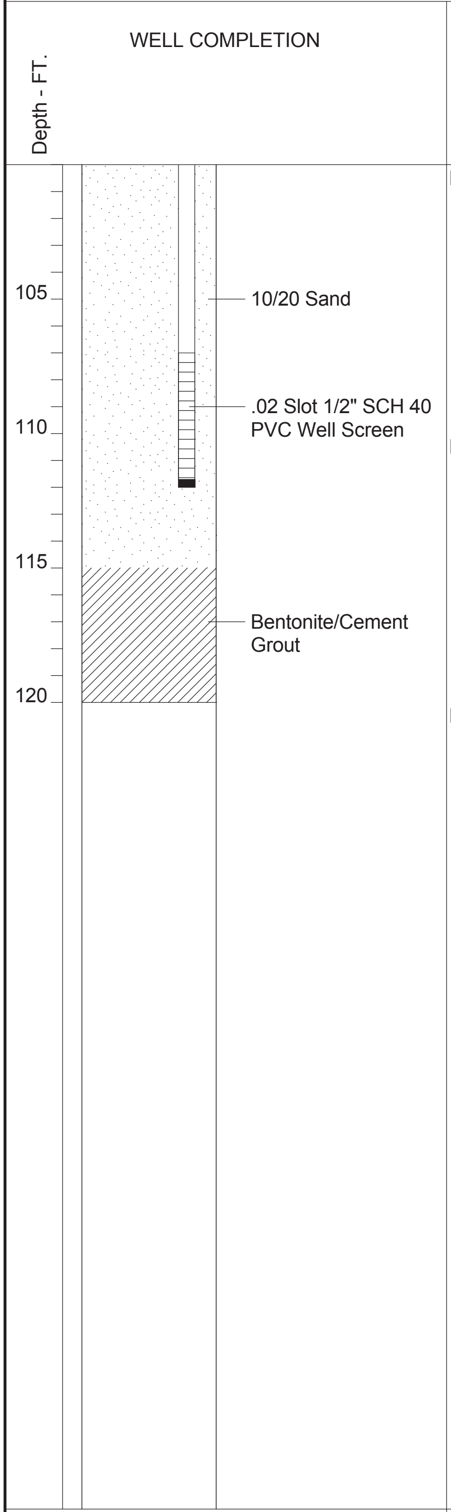
Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
9 11 14	100	20.5			▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; moist.	CL	0	5	95	M
21 51	30	13.6		60	▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; moist.	CL	0	5	95	M
13 52	30	2.0		70	▨	LEAN CLAY; Reddish brown (5YR 4/4); sand fine; 20% caliche; high plasticity; moist.	CL	0	5	95	M
N/A	0	N/A		75		WELLL GRADED GRAVEL; Reddish brown (5YR 4/4); angular; gravel to 3"; moist.	GW	85	10	5	M
N/A	0	N/A		80		WELL GRADED SAND; Reddish brown (5YR 4/3); gravel to 2"; angular to sub angular; moist.	SW	45	50	5	M
N/A	0	N/A		90		WELL GRADED SAND; Reddish brown (5YR 4/3); gravel to 2"; angular to sub angular; moist.	SW	45	50	5	M

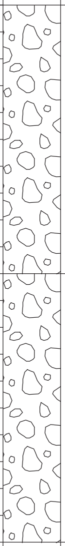
HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of VP-103

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	6b

Project: COOPER AND COMMERCE WQARF SITE
Boring: **VP-103**
Pg. 3 of 3
Drilling Co: **Water Development Corp.**
Drilling Method: **Air Rotary Casing Hammer**
Date Started: **4/10/06**
Location:
Sampler:
Date Completed: **4/11/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev:
Meas. Pt. Elev:
Reviewed by: **RP**





Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
N/A	0	N/A			WELL GRADED SAND; Reddish brown (5YR 4/3); gravel to 2"; angular to sub angular; moist.	SW	45	50	5	M
N/A	0	N/A		110	WELL GRADED GRAVEL; Reddish brown (5YR 4/4); gravel angular to sub angular; moist.	GW	85	10	5	M
N/A	0	N/A		120	WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 4/4); gravel well graded to 2"; angular to sub angular; moist.	SW	50	45	5	M

HYDRO GEO CHEM, INC.

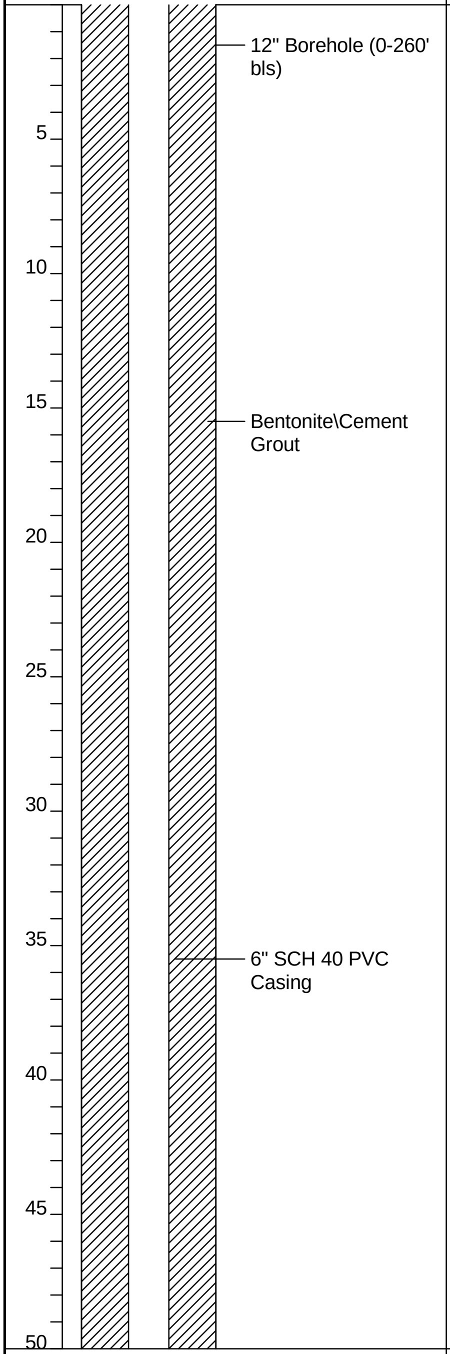
Lithologic Log and Well Construction Details of VP-103

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	6c

Project: COOPER AND COMMERCE WQARF SITE
Boring: **EW-101**
Pg. 1 of 6

Drilling Co: **Water Development Corp.**
Drilling Method: **Mud Rotary**
Date Started: **3/20/06**
Location:
Sampler Type:
Date Completed: **3/29/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by: **RP**

WELL COMPLETION



Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
N/A	0	0.3		SILTY SAND; Dark reddish brown (5YR 3/3); Lean clay with sand; Moist.	CL	0	20	80	M
	0	0.0		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); Silt; trace of sand; moist.	ML	0	5	95	M
	0	0.0		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); Silt; trace of sand; moist.	ML	0	5	95	M
	0	0.0		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); Silt; trace of sand; moist.	CL	0	5	95	M
	0	0.5		LEAN CLAY WITH SAND; Reddish brown (5YR 4/4); Silt; trace of sand; moist.	CL	0	5	95	D
		N/A		WELL GRADED SAND WITH CLAY; Reddish brown (5YR 4/4); Trace of fine gravel; wet.	SW-SC	5	70	25	
	0	1.9		SANDY LEAN CLAY; Reddish brown (5YR 5/4); some sand.	CL	5	30	65	
	0			LEAN CLAY WITH SAND; Reddish brown with sand (5YR 5/4); some cementation.	CL	0	25	75	
	0	0.9		LEAN CLAY WITH SAND; Reddish brown with fine sand (5YR 5/4); some cementation.	CL	0	25	75	
	0	0.5		LEAN CLAY WITH SAND; Reddish brown with fine sand (5YR 5/4); some cementation	CL	0	20	80	

HYDRO GEO CHEM, INC.

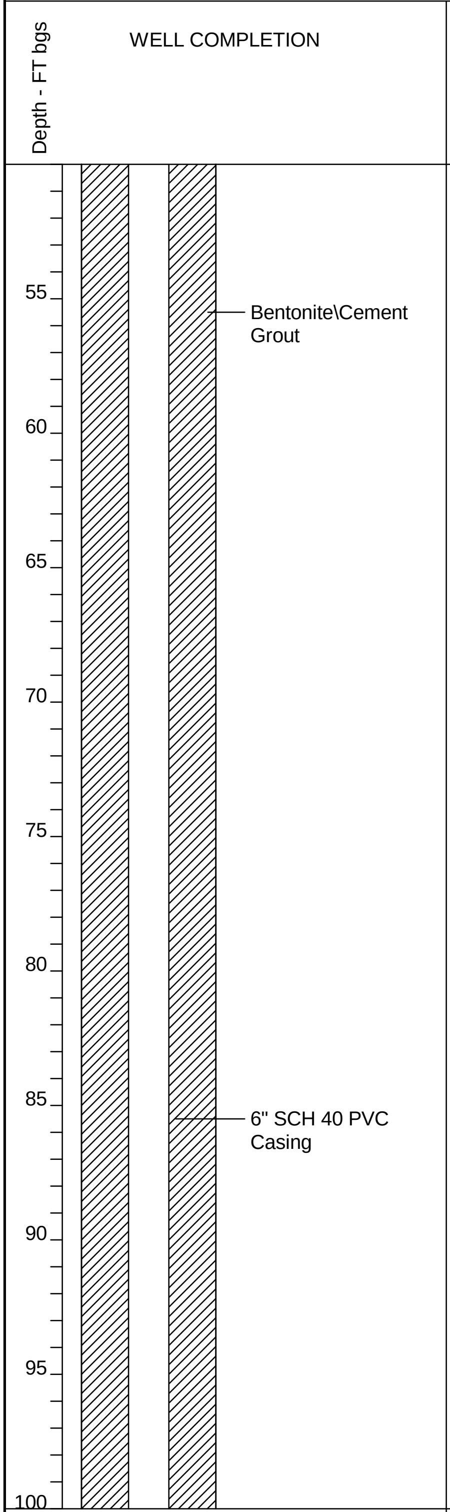
Lithologic Log and Well Construction Details of EW-101

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	3a

Project: COOPER AND COMMERCE WQARF SITE
Boring: **EW-101**
Pg. 2 of 6

Drilling Co: **Water Development Corp.**
Drilling Method: **Mud Rotary**
Date Started: **3/20/06**
Location:
Sampler Type:
Date Completed: **3/29/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by: **RP**



Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
	0	0.7		LEAN CLAY WITH SAND; Reddish brown with fine sand (5YR 5/4); some cementation.	CL	0	15	85	
	0			LEAN CLAY; Reddish brown clay with fine sand (5YR 5/4); some cementation.	CL	0	10	90	
	0	1.4		LEAN CLAY; Reddish brown clay with sand (5YR 5/4).	CL	0	10	90	
	0	0.8		LEAN CLAY; Reddish brown clay with sand (5YR 5/4).	CL	0	10	90	
	0	0.0		WELL GRADED SAND WITH CLAY; Reddish brown (5YR 2.5/1 to 5YR 4/4); angular.	SW-SC	10	80	10	
	0	0.0		WELL GRADED SAND; Reddish brown to dark brown (5YR 4/5); angular; trace of gravel and clay.	SW	5	90	5	
	0	0.0		POORLY GRADED GRAVEL WITH SAND; Reddish brown to dark brown (5YR 2.5/1); angular; gravel particles to 0.75" dia.; slow drilling.	GP	60	35	5	
	0	0.0		WELL GRADED SAND WITH GRAVEL; Reddish brown to dark brown (5YR 5/4); angular.	SW	30	65	5	

HYDRO GEO CHEM, INC.

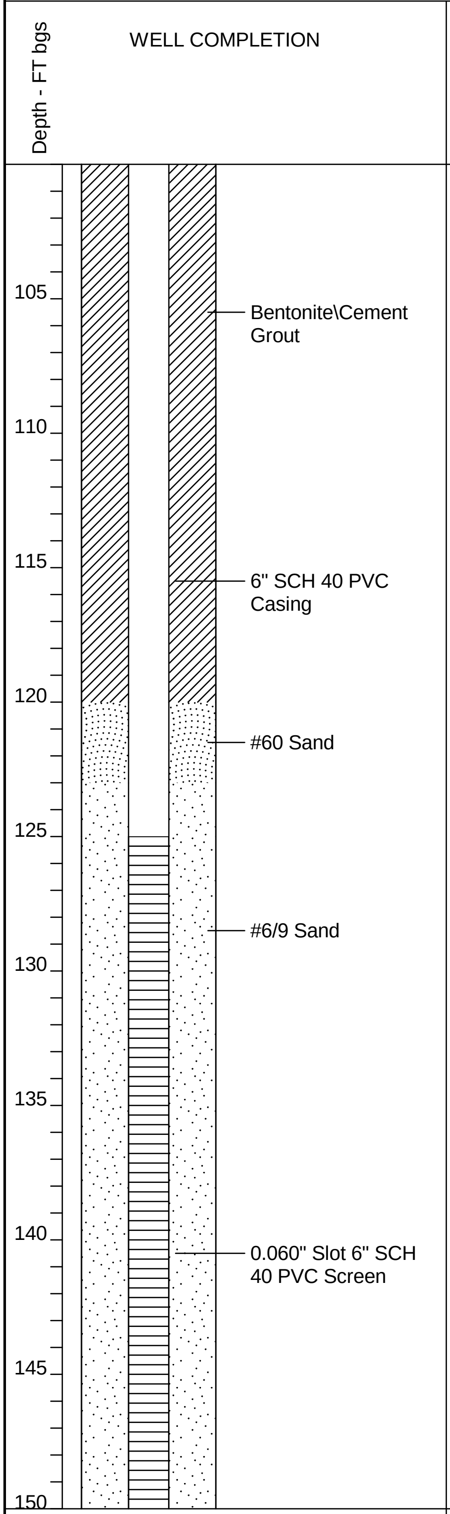
Lithologic Log and Well Construction Details of EW-101

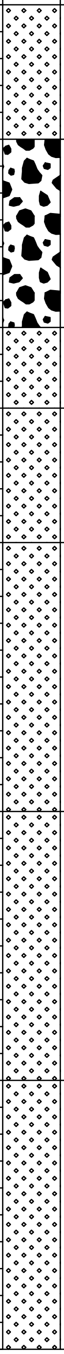
COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	3b

Project: COOPER AND COMMERCE WQARF SITE Boring: **EW-101**

Drilling Co: **Water Development Corp.** Drilling Method: **Mud Rotary** Date Started: **3/20/06**
Location: ________ Sampler Type: ________ Date Completed: **3/29/06**
Desc. of Meas Pt: ________ Logged by: **B.Anderson**
Land Surf. Elev (ft amsl): ________ Meas. Pt. Elev: ________ Reviewed by: **RP**





Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
	0	0.0			WELL GRADED SAND WITH GRAVEL; Reddish brown to dark brown (5YR 5/4); angular	SW	35	60	5	
	0	0.0		105	POORLY GRADED GRAVEL WITH SAND; Reddish brown to dark brown (5YR 4/5); angular.	GP	65	30	5	
				110						
	0	0.0			WELL GRADED SAND WITH GRAVEL; Reddish brown to dark brown (5YR 4/5); angular.	SW	20	75	5	
	0	0.0		115	WELL GRADED SAND WITH GRAVEL; Reddish brown to dark brown (5YR 4/5); angular.	SW	15	80	5	
	0	N/A		120	WELL GRADED SAND WITH GRAVEL; Reddish brown to dark brown (5YR 4/5); angular.	SW	15	80	5	
				125						
	0	N/A		130	WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 5/3); gravel to 2" broken; rounded to sub rounded; very hard; sample refusal.	SW	25	70	5	
				135						
	0	N/A		140	WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 5/3); gravel to 2" broken; rounded to sub rounded; very hard; sample refusal.	SW	25	70	5	
				145						
				150						

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of EW-101

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	3c

Project: COOPER AND COMMERCE WQARF SITE Boring: **EW-101** Pg. 4 of 6

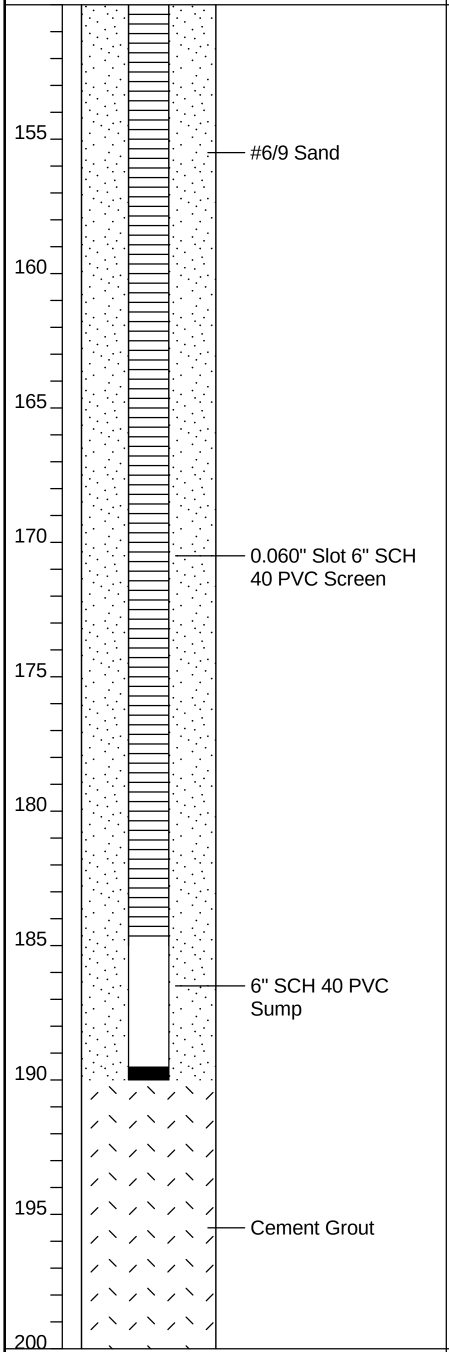
Drilling Co: **Water Development Corp.** Drilling Method: **Mud Rotary** Date Started: **3/20/06**

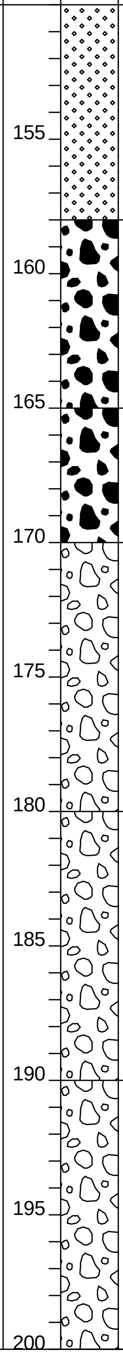
Location: ______ Sampler Type: ______ Date Completed: **3/29/06**

Desc. of Meas Pt: ______ Logged by: **B.Anderson**

Land Surf. Elev (ft amsl): ______ Meas. Pt. Elev: ______ Reviewed by: **RP**

WELL COMPLETION





Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
				WELL GRADED SAND WITH GRAVEL; Reddish brown (5YR 5/3); gravel to 2" broken; rounded to sub rounded; very hard; sample refusal.*(continued)*					
	0								
	0	N/A		POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); coarse gravel; angular; very hard drilling.	GP	80	15	5	
	0	N/A		POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); coarse gravel; angular; very hard drilling.	GP	80	15	5	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); medium to coarse gravel; angular to sub angular; very hard.	GW	85	10	5	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); medium to coarse gravel; angular to sub angular; very hard.	GW	85	10	5	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); medium to coarse gravel; angular to sub angular; very hard.	GW	85	10	5	

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of EW-101

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	3d

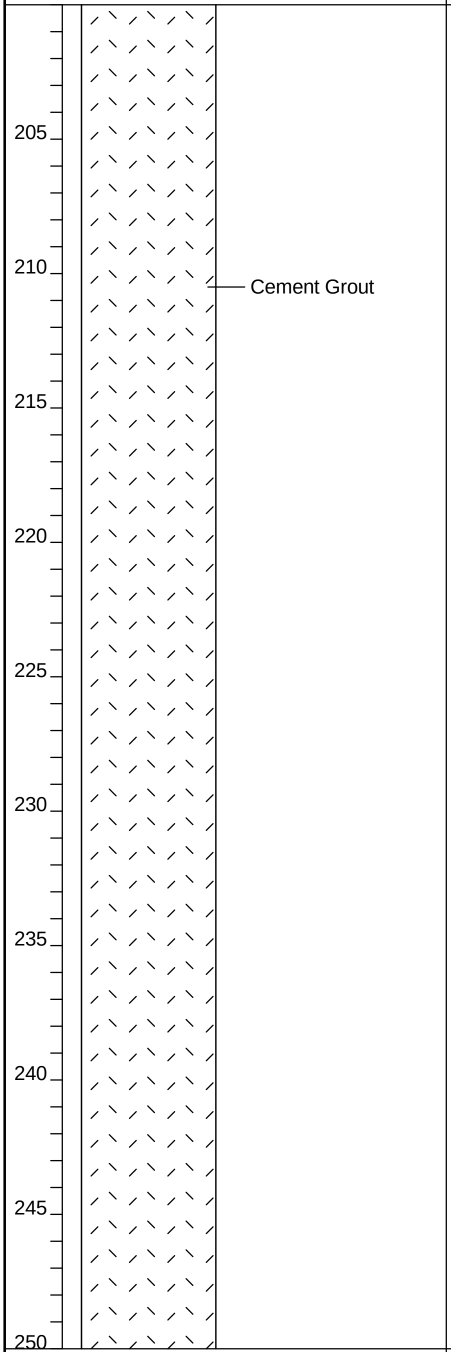
Project: COOPER AND COMMERCE WQARF SITE Boring: **EW-101** Pg. 5 of 6

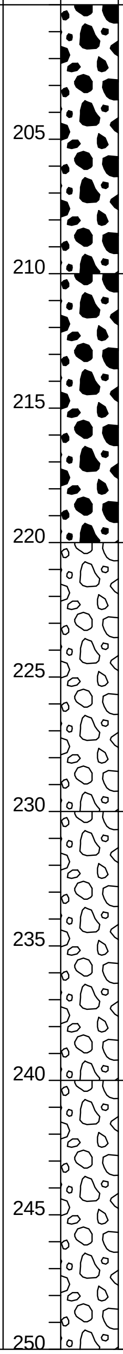
Drilling Co: **Water Development Corp.** Drilling Method: **Mud Rotary** Date Started: **3/20/06**

Location: ____ Sampler Type: ____ Date Completed: **3/29/06**

Desc. of Meas Pt: ____ Logged by: **B.Anderson**

Land Surf. Elev (ft amsl): ____ Meas. Pt. Elev: ____ Reviewed by: **RP**





Blow Count	% Recovery	PID (ppm)	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
	0	N/A		POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); gravel angular; sand coarse only; very hard.	GP	90	10	0	
	0	N/A		POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); gravel angular; sand coarse only; very hard.	GP	90	10	0	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); gravel is sub angular to angular; sand is poorly graded medium to coarse.	GW	80	15	5	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); gravel is sub angular to angular; sand is poorly graded medium to coarse.	GW	75	20	5	
	0	N/A		WELL GRADED GRAVEL WITH SAND; Reddish brown (5YR 5/3); sand is medium to coarse; gravel angular to sub angular.	GW	65	30	5	

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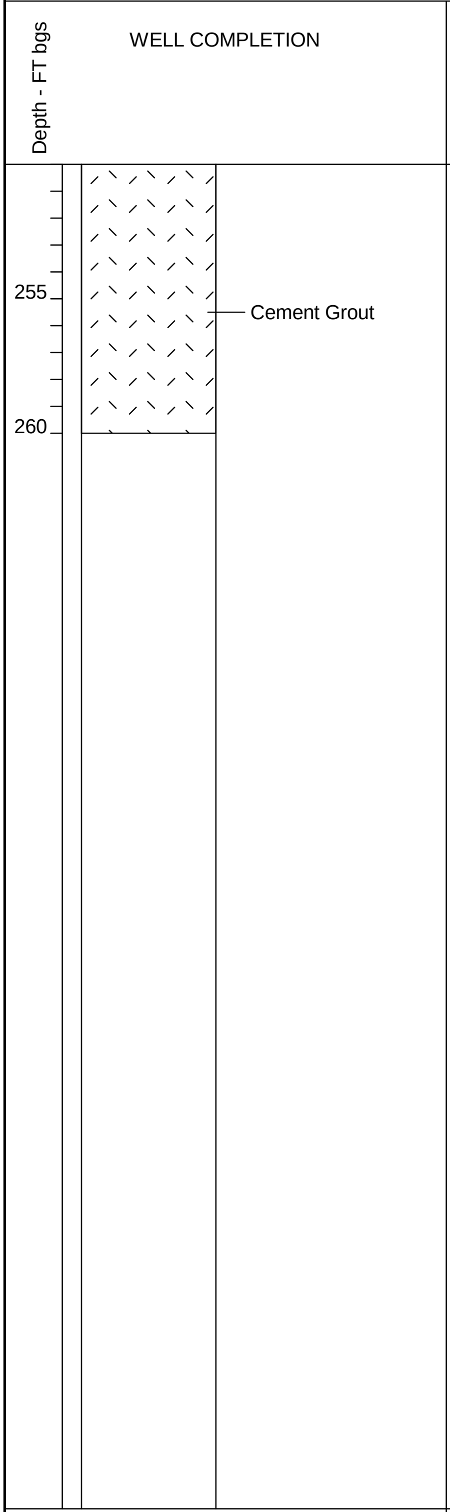
Lithologic Log and Well Construction Details of EW-101

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	3e

Project: COOPER AND COMMERCE WQARF SITE
Boring: **EW-101**
Pg. 6 of 6
Drilling Co: **Water Development Corp.**
Drilling Method: **Mud Rotary**
Date Started: **3/20/06**
Location:
Sampler Type:
Date Completed: **3/29/06**
Desc. of Meas Pt:
Logged by: **B.Anderson**
Land Surf. Elev (ft amsl):
Meas. Pt. Elev:
Reviewed by: **RP**



Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT bgs	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
	0	N/A		255 260	●	POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); coarse;angular; very hard.	GP	80	15	5	
	0	N/A				POORLY GRADED GRAVEL; Reddish brown (5YR 5/4); coarse;angular; very hard.	GP	80	15	5	

HYDRO GEO CHEM, INC.

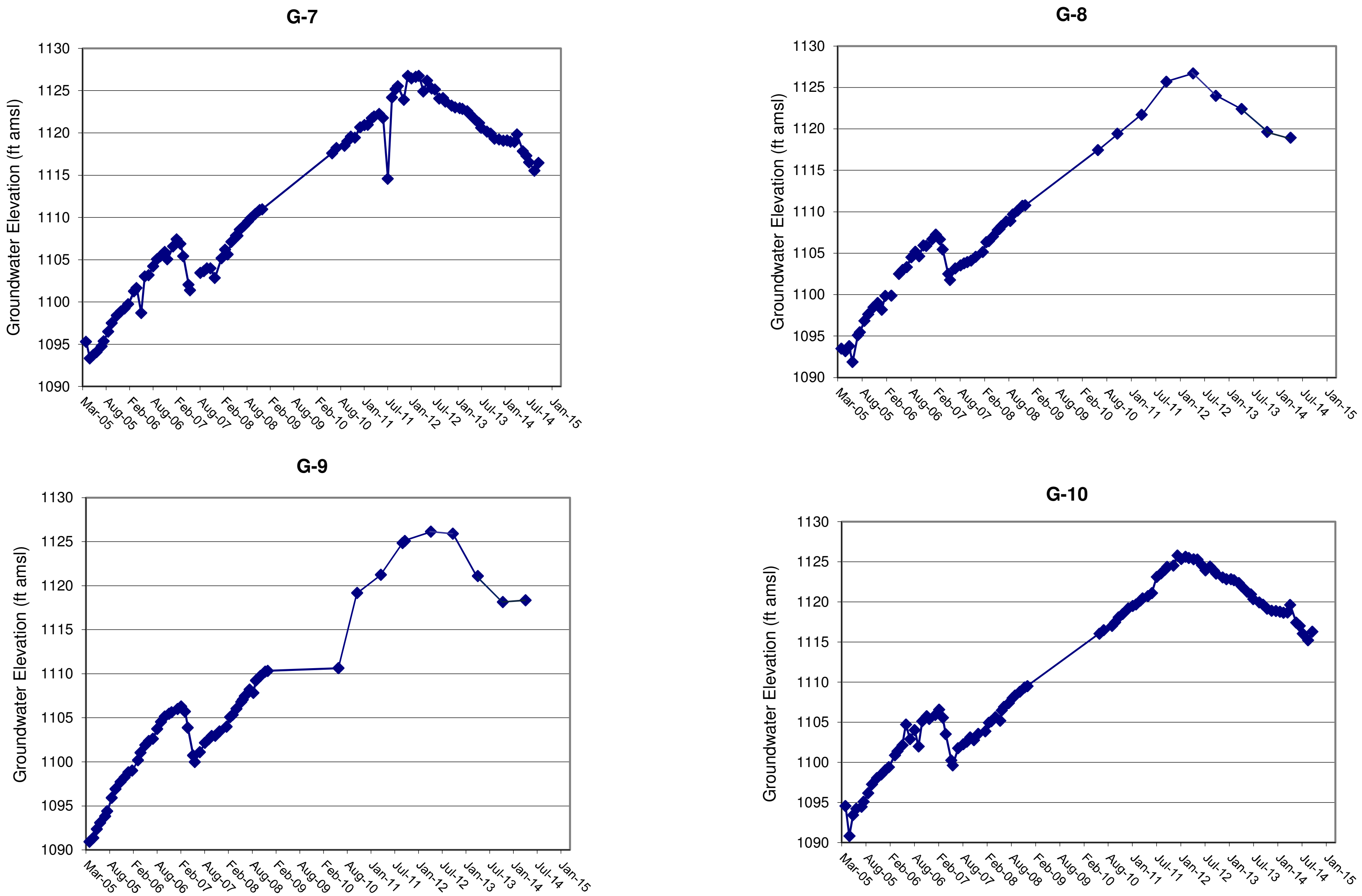
Lithologic Log and Well Construction Details of EW-101

COOPER AND COMMERCE WQARF SITE
Gilbert, Arizona

Approved	Date	Revised	Date	Reference:	FIG.
				H:\833000\gINT	**3f**

APPENDIX F

MONTHLY WATER LEVEL HYDROGRAPHS



Notes:

Depths to water shown are those collected by HGC.
Table 3 shows historic groundwater elevation data.

Wells re-surveyed July, 2011
G-7 Measuring Point Elevation Difference = +1.54 feet
G-8 Measuring Point Elevation Difference = +1.94 feet
G-9 Measuring Point Elevation Difference = +1.92 feet
G-10 Measuring Point Elevation Difference = +1.85 feet

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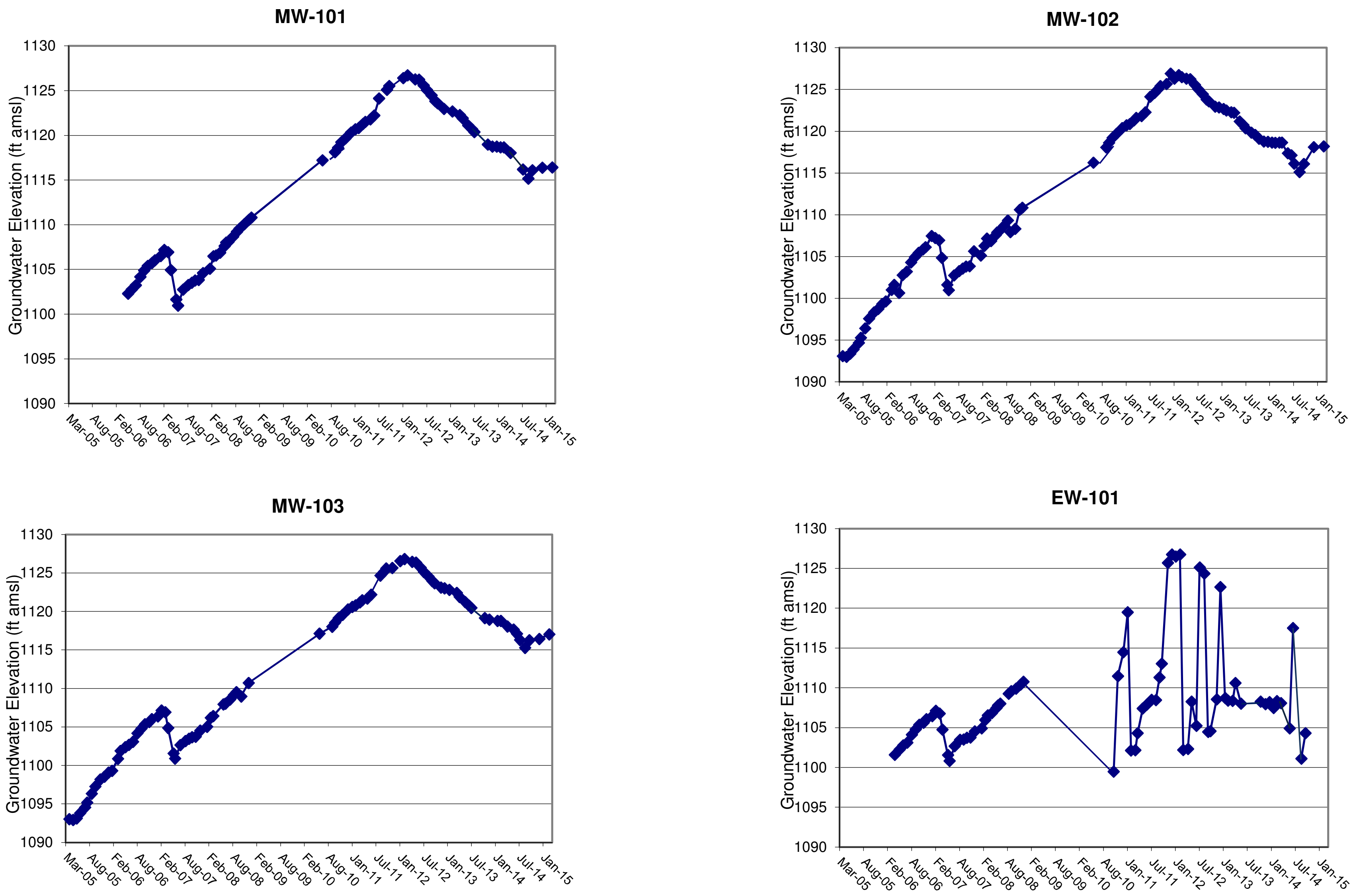
HYDROGRAPHS
G-7, G-8, G-9, AND G-10

APPROVED	FJS	DATE	4/30/15	FIGURE	**F.1**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls



Notes:

Depths to water shown are those collected by HGC.
Table 3 shows historic groundwater elevation data.

Wells re-surveyed July, 2011
MW-101 Measuring Point Elevation Difference = +1.99 feet
MW-102 Measuring Point Elevation Difference = +3.45 feet
MW-103 Measuring Point Elevation Difference = +2.33 feet
EW-101 Measuring Point Elevation Difference = +3.04 feet

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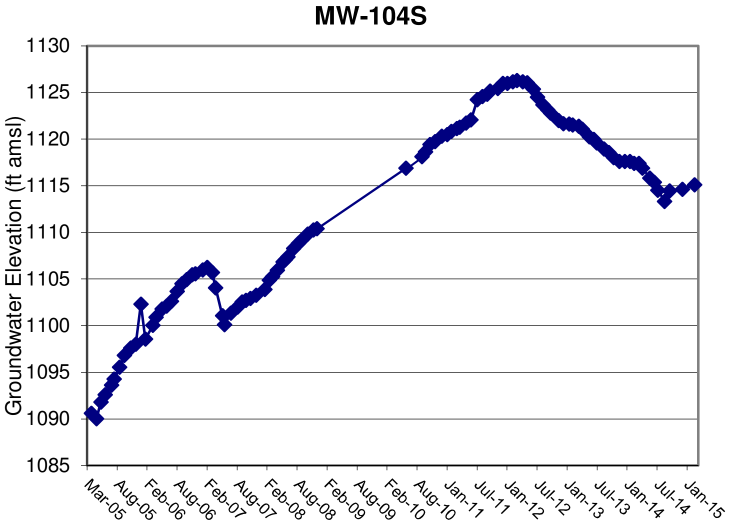
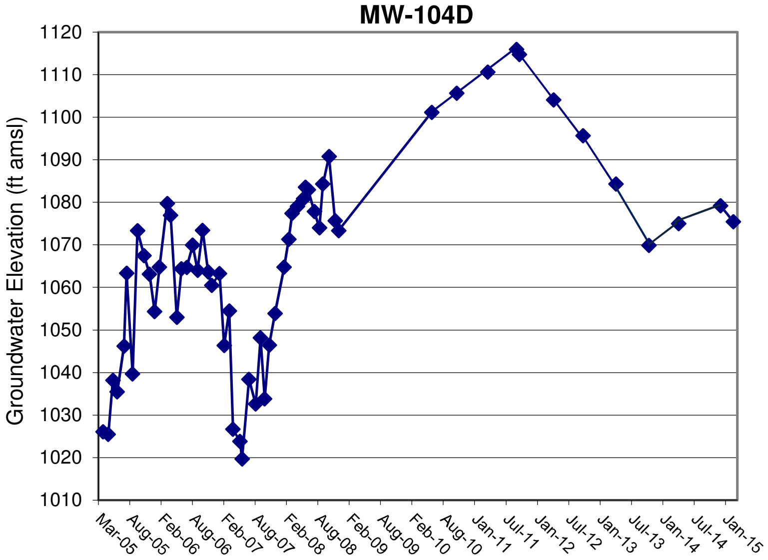
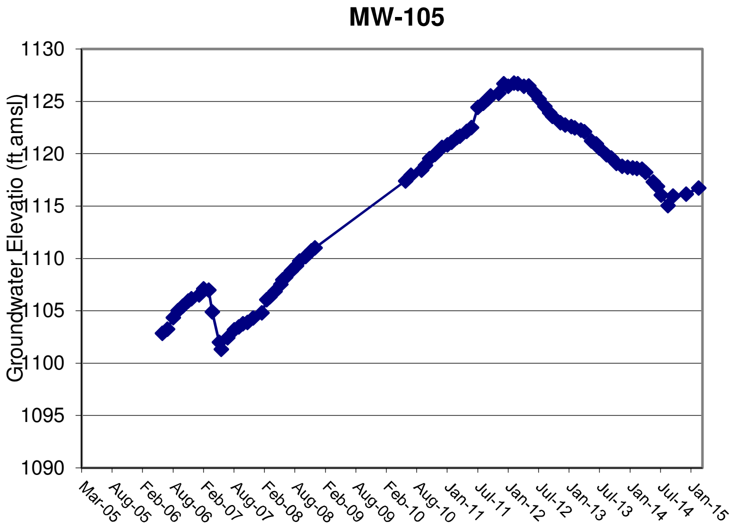
HYDROGRAPHS
MW-101, MW-102, MW-103, AND EW-101

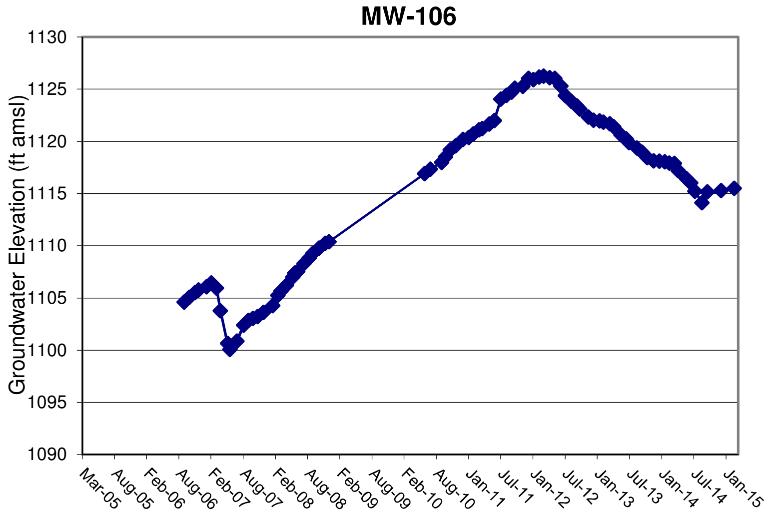
APPROVED	FJS	DATE	4/30/15	FIGURE	**F.2**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls









__Notes:__
Depths to water shown are those collected by HGC.
Table 3 shows historic groundwater elevation data.
Wells re-surveyed July, 2011
MW-104S Measuring Point Elevation Difference = +1.88 feet
MW-104D Measuring Point Elevation Difference = +1.84 feet
MW-105 Measuring Point Elevation Difference = +1.75 feet
MW-106 Measuring Point Elevation Difference = +1.80 feet

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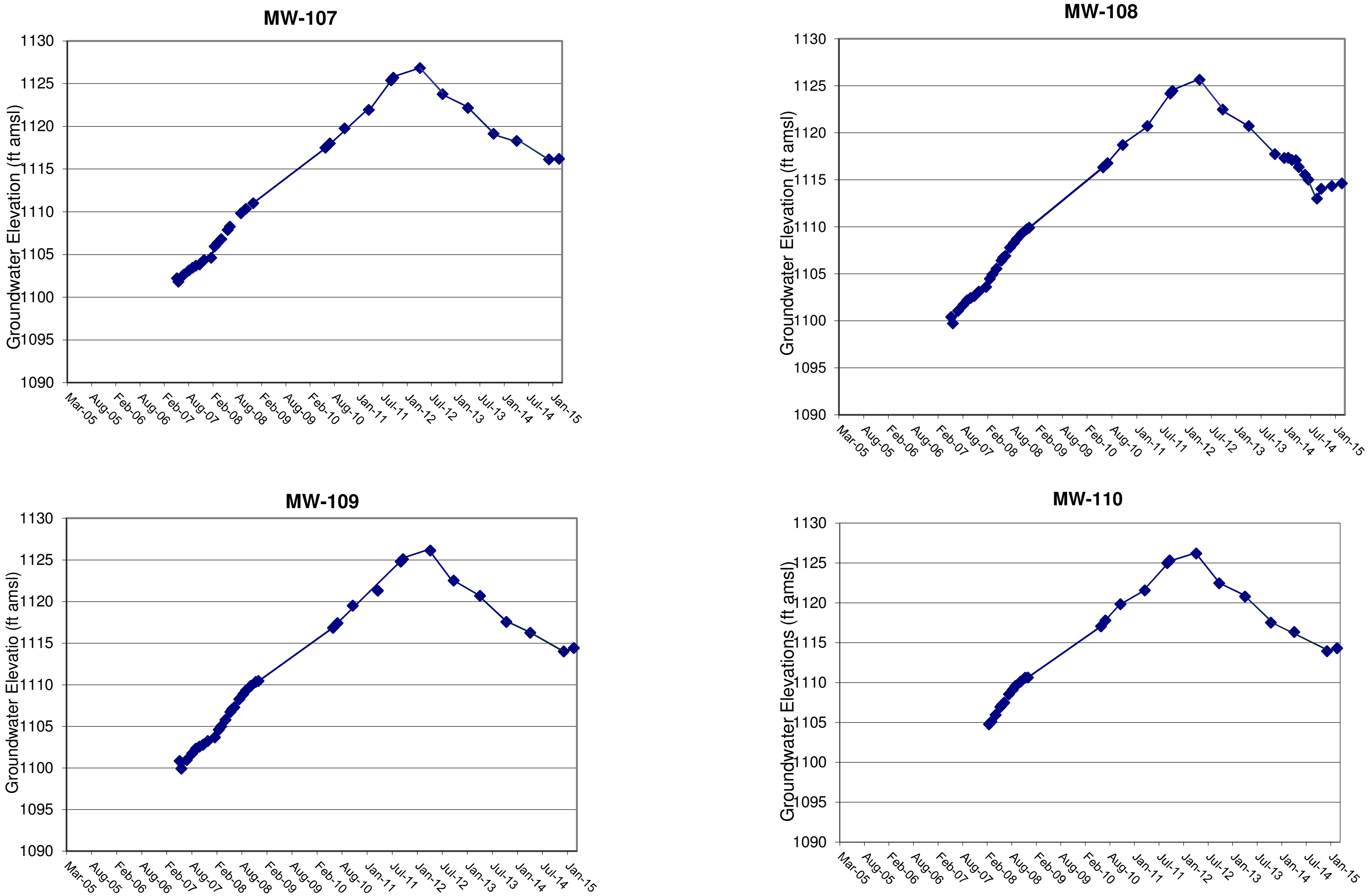
HYDROGRAPHS
MW-104S, MW-104D, MW-105 AND MW-106

APPROVED	DATE	FIGURE
FJS	4/30/15	**F.3**



Notes:
MW-107 installed 5/14/07; MW-108 installed 5/16/07
MW-109 installed 5/21/07; MW-110 installed 2/21/08
Wells re-surveyed July, 2011
MW-107 Measuring Point Elevation Difference = +1.82 feet
MW-108 Measuring Point Elevation Difference = +1.84 feet
MW-109 Measuring Point Elevation Difference = +1.88 feet
MW-110 Measuring Point Elevation Difference = +1.80 feet

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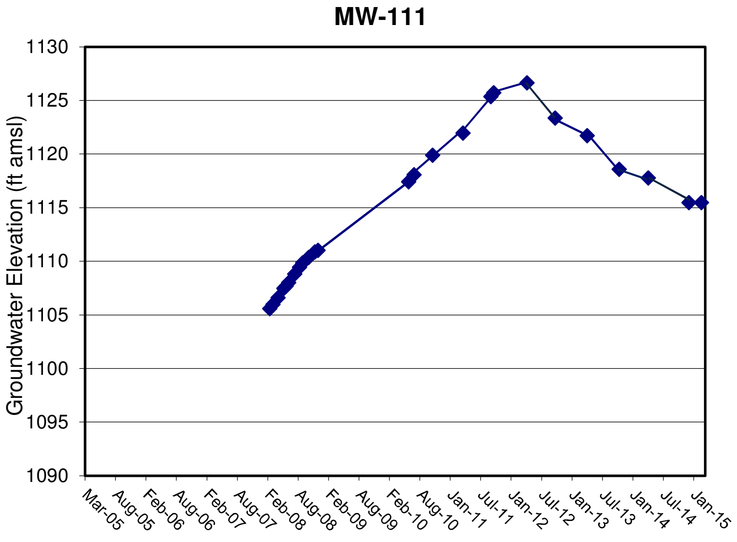
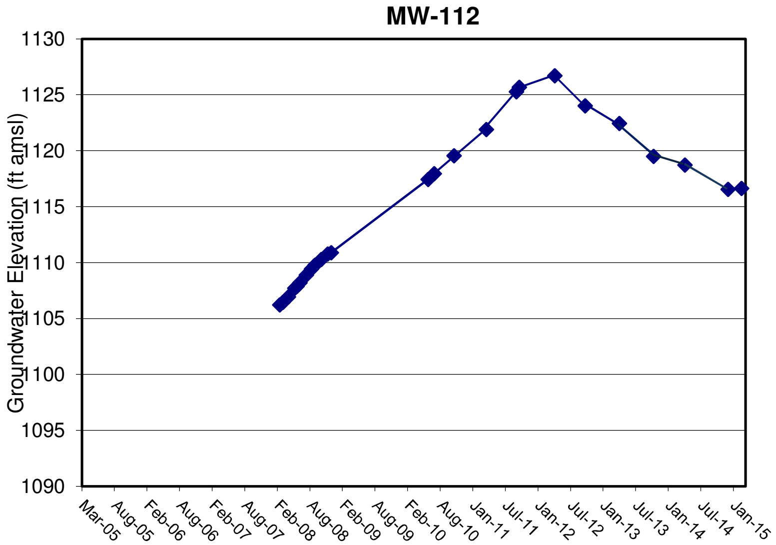
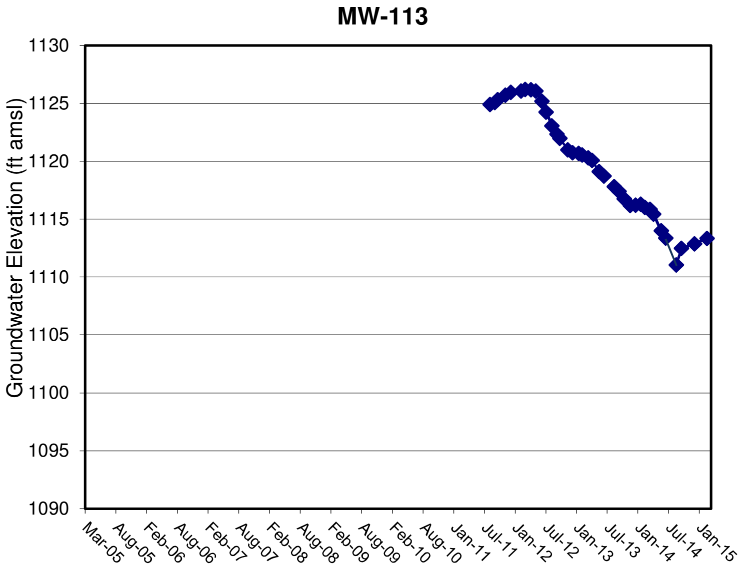
HYDROGRAPHS
MW-107, MW-108, MW-109 AND MW-110

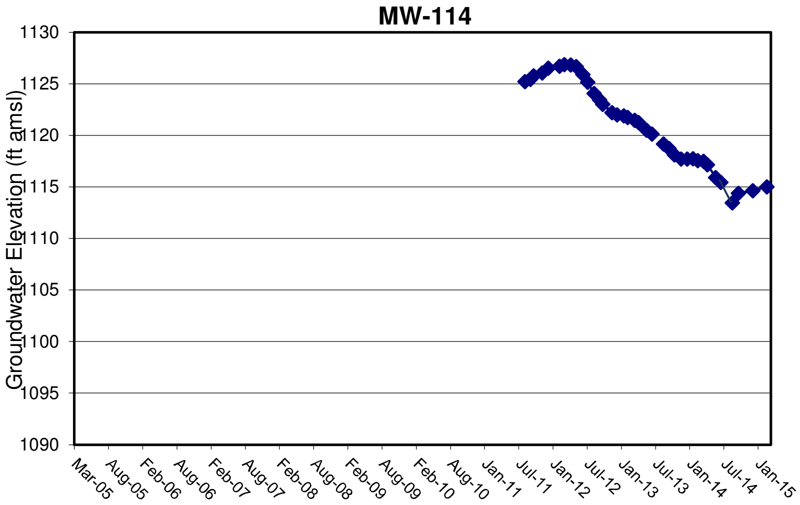
APPROVED FJS	DATE 4/30/15	FIGURE **F.4**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls MW107, 108,109 and 110









Notes:
MW-111 installed 2/19/08; MW-112 installed 2/18/08
MW-113 installed 6/27/11; MW-114 installed 7/7/11
Wells re-surveyed July, 2011
MW-111 Measuring Point Elevation Difference = +1.79 feet
MW-112 Measuring Point Elevation Difference = +1.81 feet
MW-113 Measuring Point Elevation Difference = NA
MW-114 Measuring Point Elevation Difference = NA

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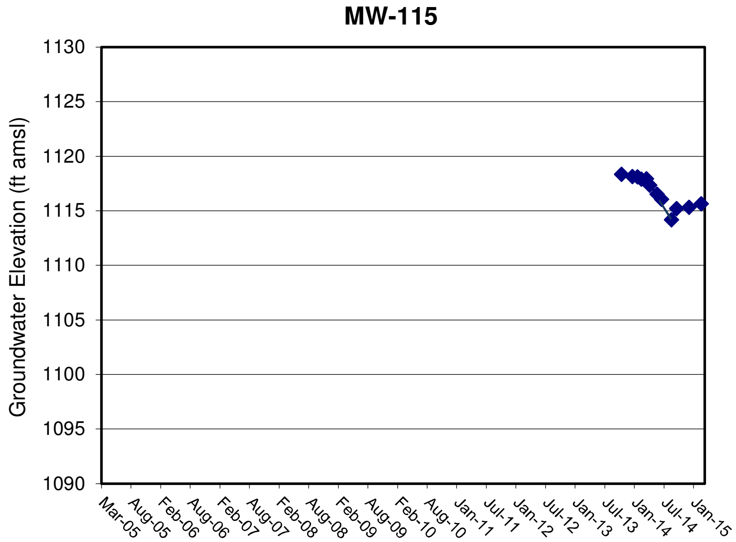
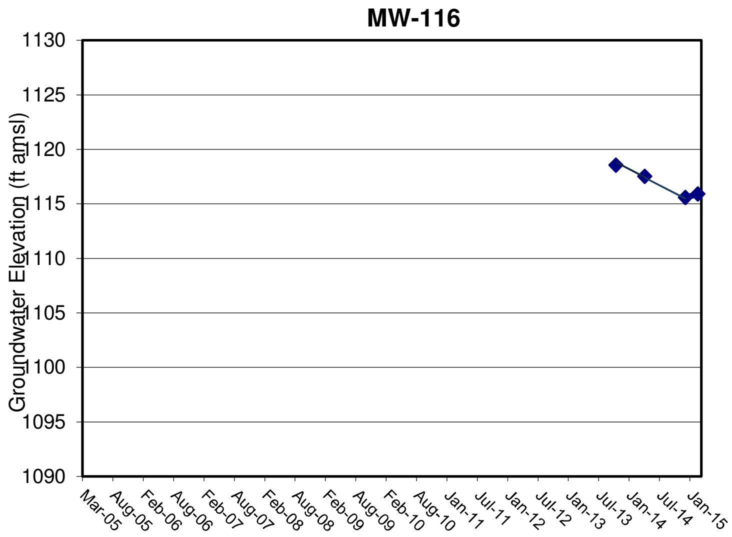
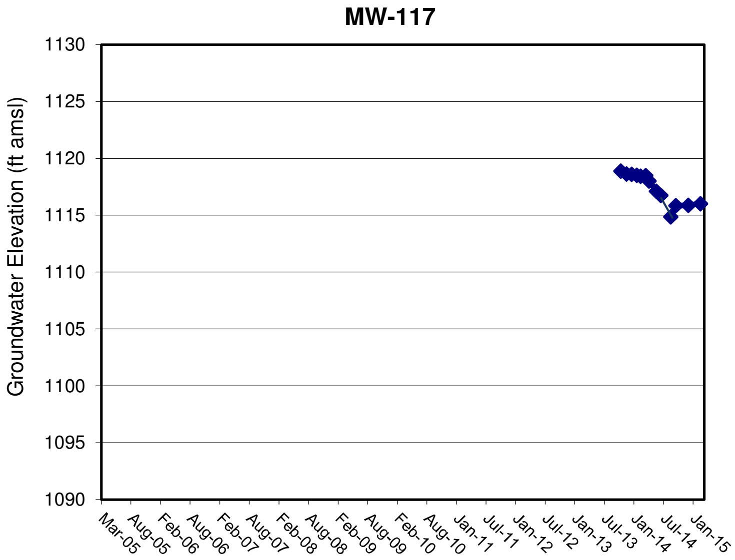
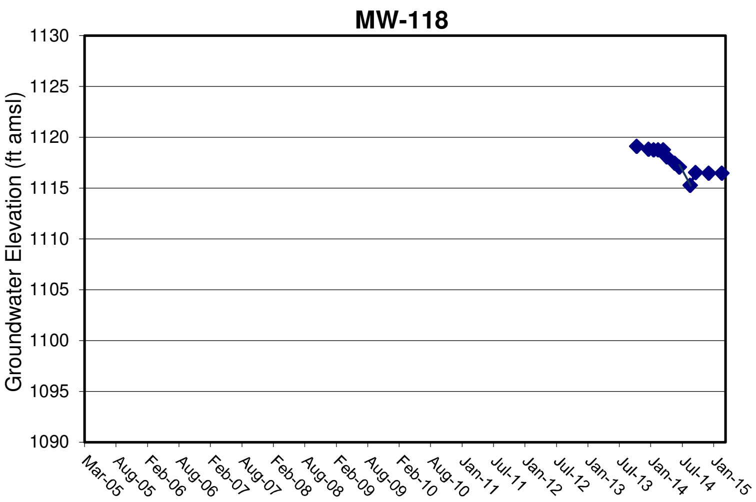
HYDROGRAPHS
MW-111, MW-112, MW-113 AND MW-114

APPROVED	DATE	FIGURE
FJS	4/30/15	**F.5**









Notes:
MW-115 installed 9/5/13; MW-116 installed 8/27/13
MW-117 installed 8/29/13; MW-118 installed 9/15/13

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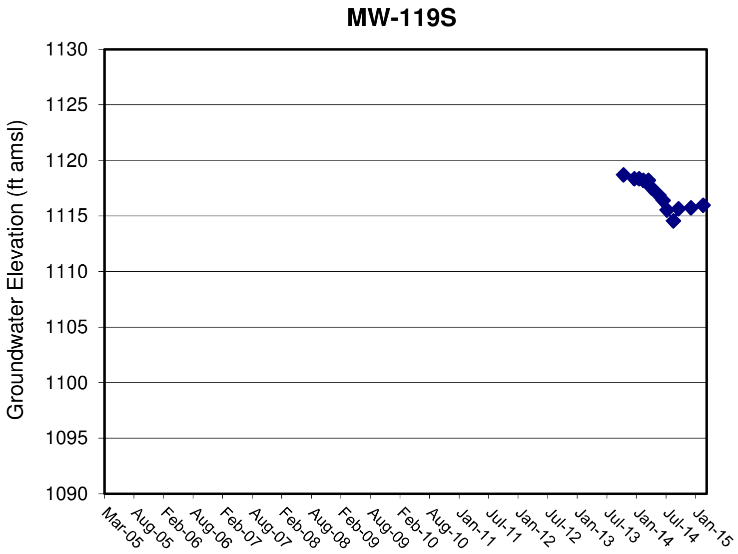
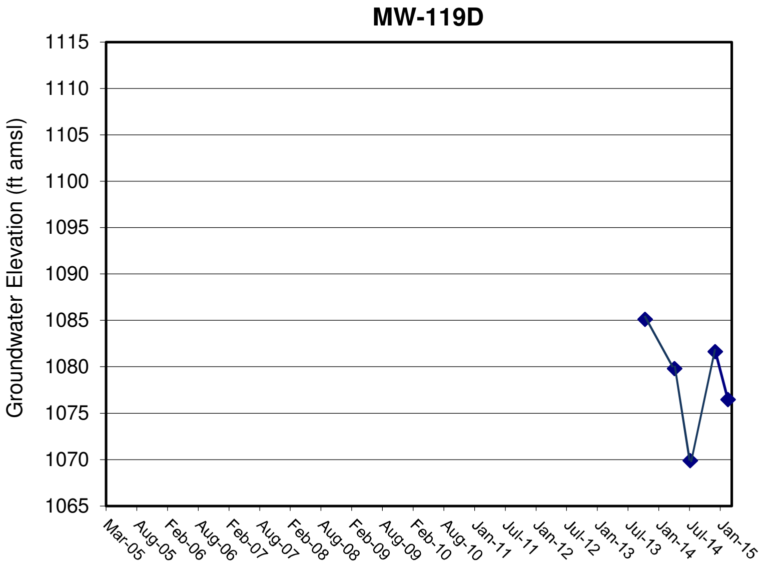
HYDROGRAPHS
MW-115, MW-116, MW-117 AND MW-118

APPROVED FJS	DATE 4/30/15	FIGURE **F.6**


MW-119S


MW-119D

Notes:
MW-119S installed 9/12/13
MW-119D installed 10/2/13

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HYDROGRAPHS
MW-119S AND MW-119D

APPROVED FJS

DATE 4/30/15

FIGURE **F.7**

H:\2010002 ADEQ Cooper & Commerce\RI, GW Mon 2010002.50_.60_.70\Remedial Investigation Report_.80 Fnl RI Rpt\Table5_GWElevations.xls MW-119S&D

APPENDIX G

GROUNDWATER ELEVATION CONTOUR MAPS

Legend

● **MW-102** 1120.71	Monitor Well and Groundwater Elevation (ft amsl) G7	✛ **G-7**	Well With Dedicated Pump (Not Currently Pumping)
☒ **EW-101**	Extraction Well	✛ **TOG-15**	Well With Dedicated Pump (Currently Pumping)
		—	Groundwater Contour (ft amsl)

Notes: Wells EW-101 and G10 not used in Contours.
NM = Not Measured
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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GROUNDWATER ELEVATIONS
JANUARY 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	02/19/11	AMC	02/19/11	2010002011G	G.1

Legend

MW-102 **1120.84**	Monitor Well and Groundwater Elevation (ft amsl) G7
EW-101	Extraction Well
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
	Groundwater Contour (ft amsl)

Notes: Wells EW-101 and G10 not used in Contours.
NM = Not Measured
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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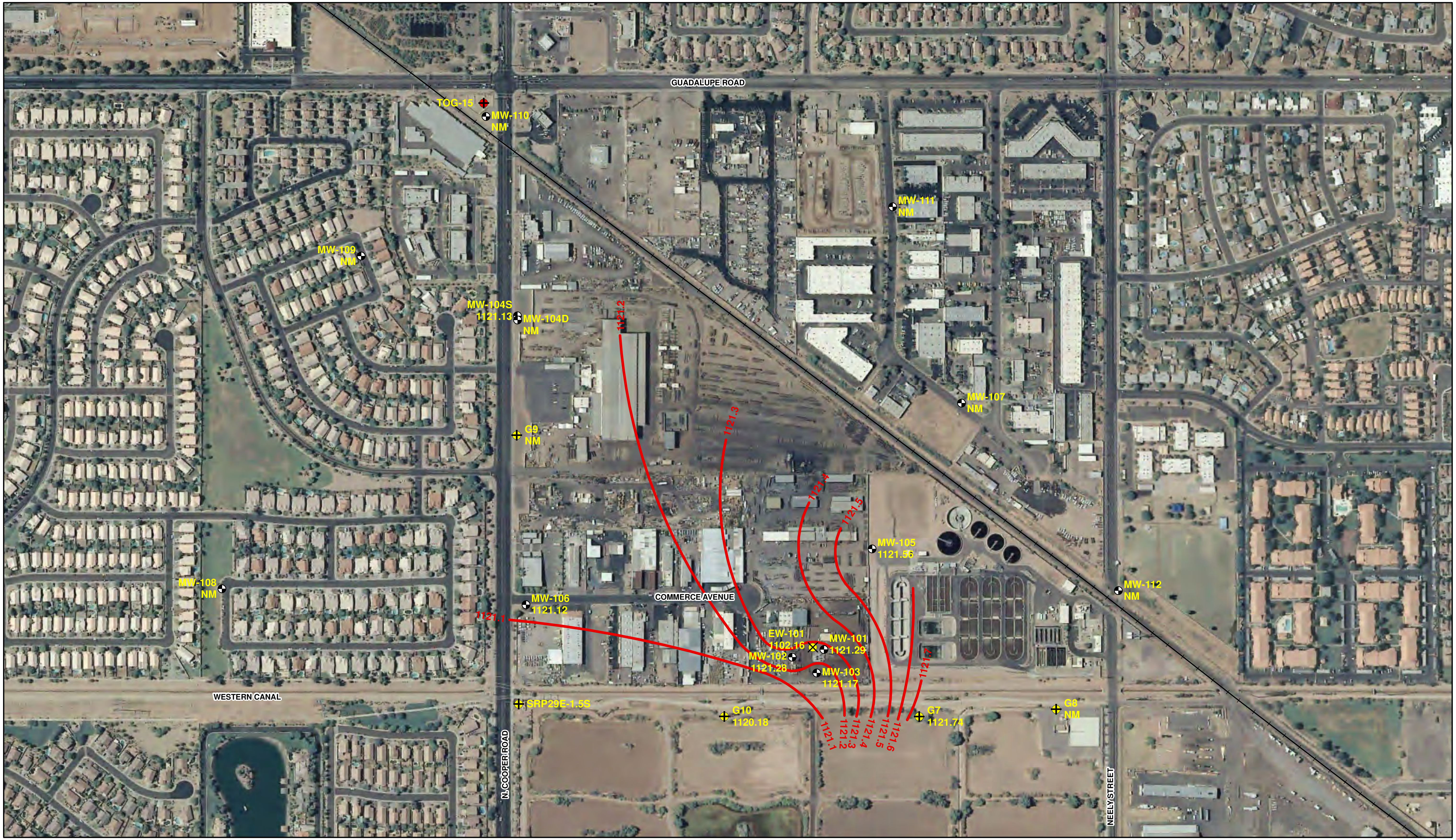
GROUNDWATER ELEVATIONS
FEBRUARY 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	03/03/11	AMC	03/03/11	2010002012G	G.2



Legend

● **MW-102** **1121.28**	Monitor Well and Groundwater Elevation (ft amsl) G7	
☒ **EW-101**	Extraction Well	
✚ **G-7**	Well With Dedicated Pump (Not Currently Pumping)	
✚ **TOG-15**	Well With Dedicated Pump (Currently Pumping)	
—	Groundwater Contour (ft amsl)	

Notes: Wells EW-101 and G10 not used in Contours.
NM = Not Measured
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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GROUNDWATER ELEVATIONS
MARCH 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	04/04/11	AMC	04/04/11	2010002013G	G.3

Legend

⊕ **MW-102** Monitor Well and Groundwater Elevation (ft amsl)
1121.59 G7

☒ **EW-101** Extraction Well

⊕ **G-7** Well With Dedicated Pump (Not Currently Pumping)

⊕ **TOG-15** Well With Dedicated Pump (Currently Pumping)

— Groundwater Contour (ft amsl)

Notes: Wells EW-101, MW-104D, and G10 not used in Contours.
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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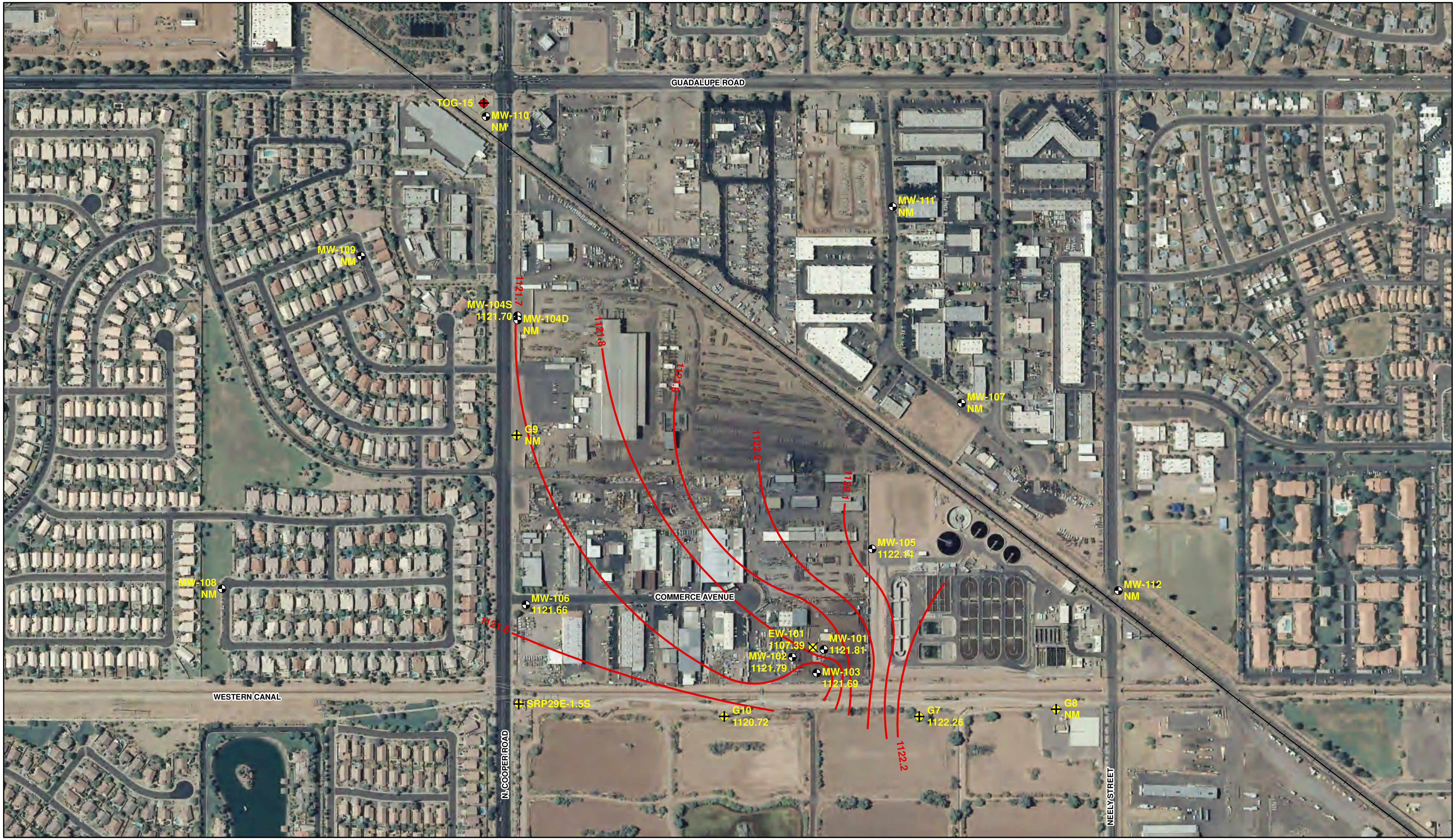
GROUNDWATER ELEVATIONS
APRIL 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	05/17/11	AMC	05/17/11	2010002015G	G.4



Legend

● **MW-102** **1121.79**	Monitor Well and Groundwater Elevation (ft amsl) G7	
☒ **EW-101**	Extraction Well	
⊕ **G-7**	Well With Dedicated Pump (Not Currently Pumping)	
⊕ **TOG-15**	Well With Dedicated Pump (Currently Pumping)	
—	Groundwater Contour (ft amsl)	

Notes: Wells EW-101 and G10 not used in Contours.
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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GROUNDWATER ELEVATIONS
MAY 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	06/03/11	AMC	06/03/11	2010002016G	G.5

Legend

● **MW-102** **1122.25**	Monitor Well and Groundwater Elevation (ft amsl) G7	✚ **G-7**	Well With Dedicated Pump (Not Currently Pumping)
☒ **EW-101**	Extraction Well	✚ **TOG-15**	Well With Dedicated Pump (Currently Pumping)
		—	Groundwater Contour (ft amsl)

Notes: Wells EW-101 and G10 not used in Contours.
Contour Interval: 0.1 Foot

0 400 800 Feet

N

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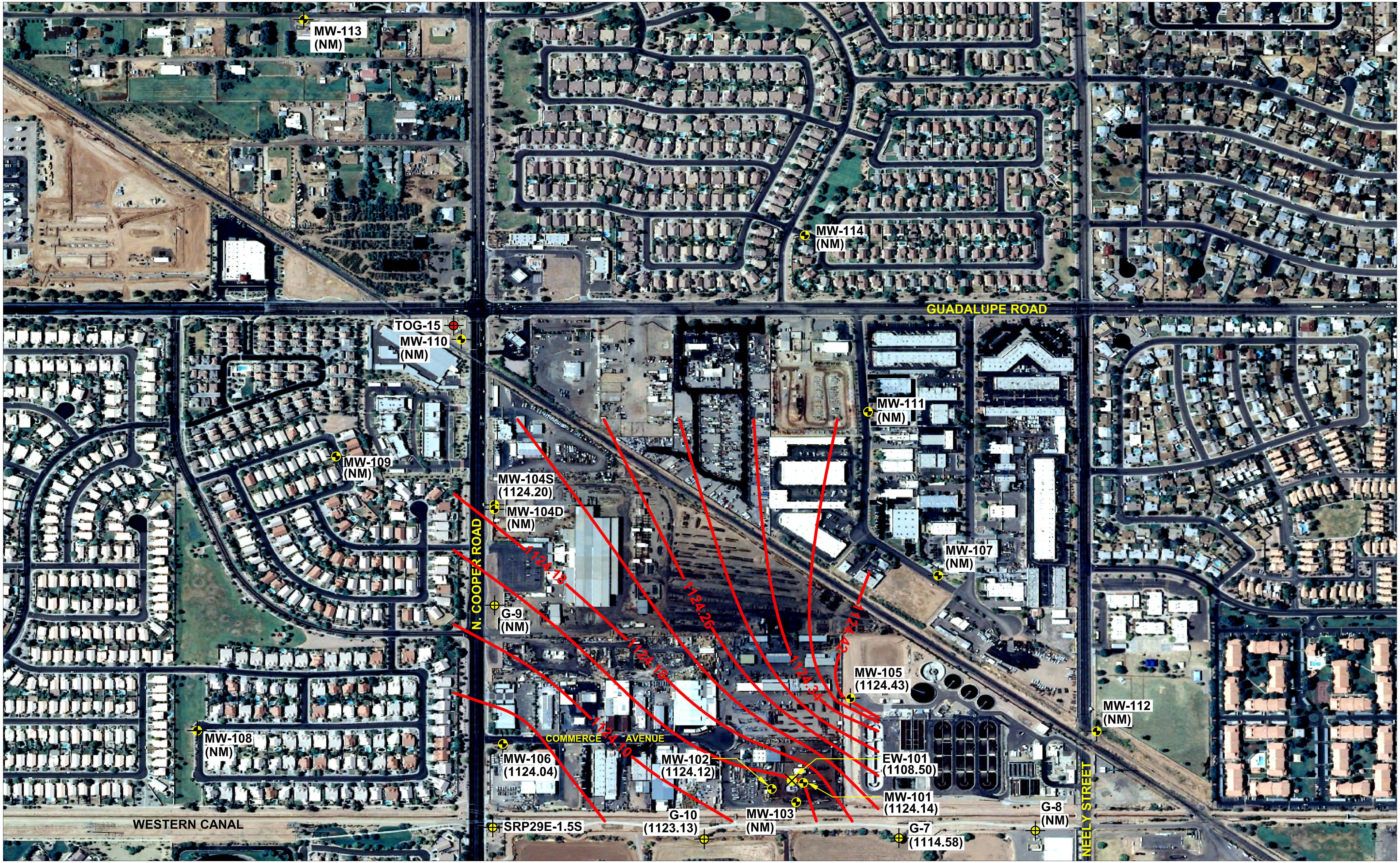
GROUNDWATER ELEVATIONS
JUNE 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CJ	06/25/11	AMC	06/25/11	2010002017G	G.6



Legend

MW-101 (1124.14)	Monitor Well and Groundwater Elevation (ft amsl)	G-7	Well With Dedicated Pump (Not Currently Pumping)
		TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well		Groundwater Contour (ft amsl)
	(EW-101 Well Pump Operating at Time of Measurement)	(NM)	Not Measured

0 400 800

SCALE IN FEET

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.04 Foot
Well measurements taken on July 29, 2011.

N

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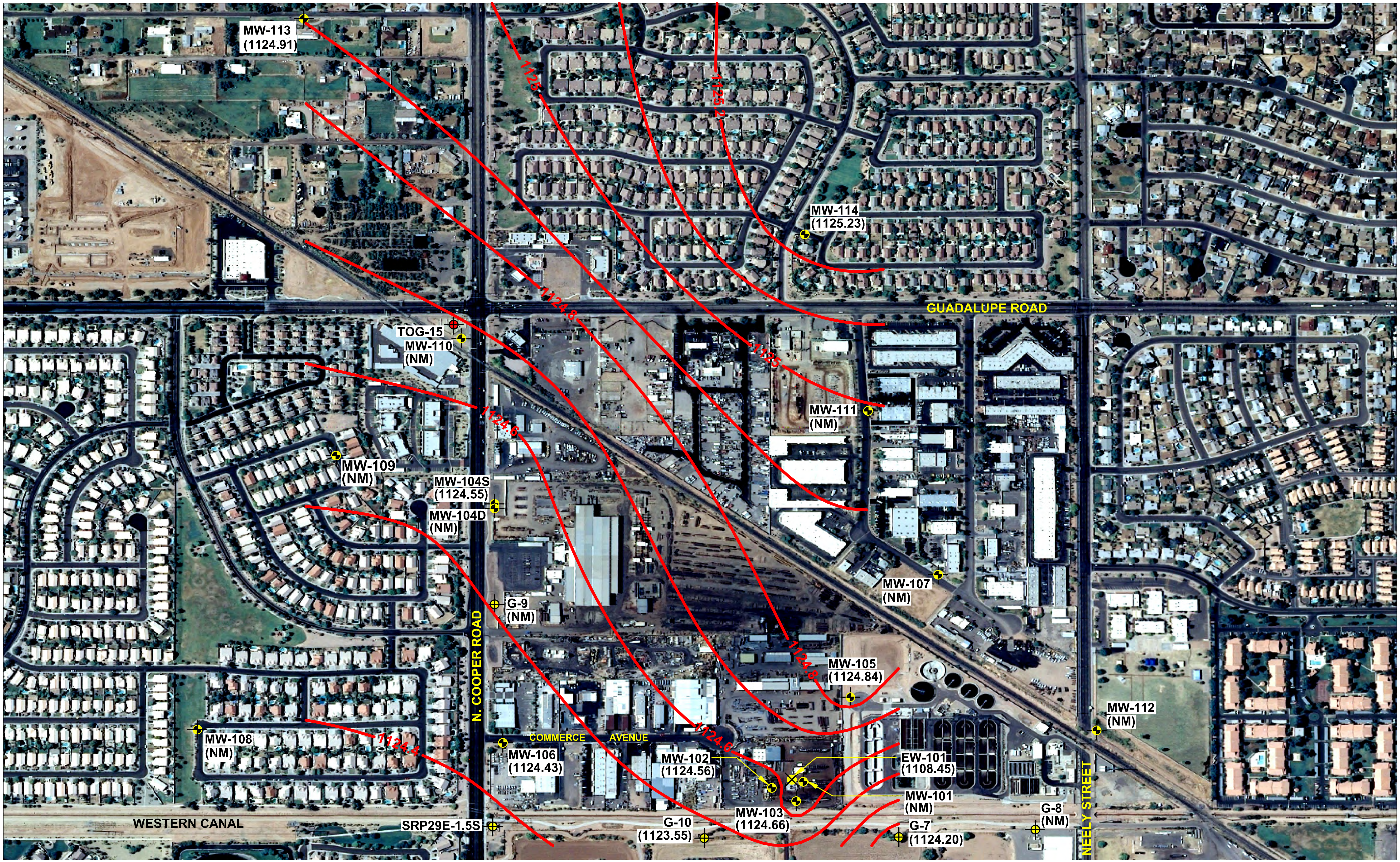
GROUNDWATER ELEVATIONS
JULY 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/9/11	JAA	12/9/11	2010002020A	G.7



Legend

MW-102 (1124.56)	Monitor Well and Groundwater Elevation (ft amsl)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

0 400 800
SCALE IN FEET

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken on August 30, 2011 and August 31, 2011.

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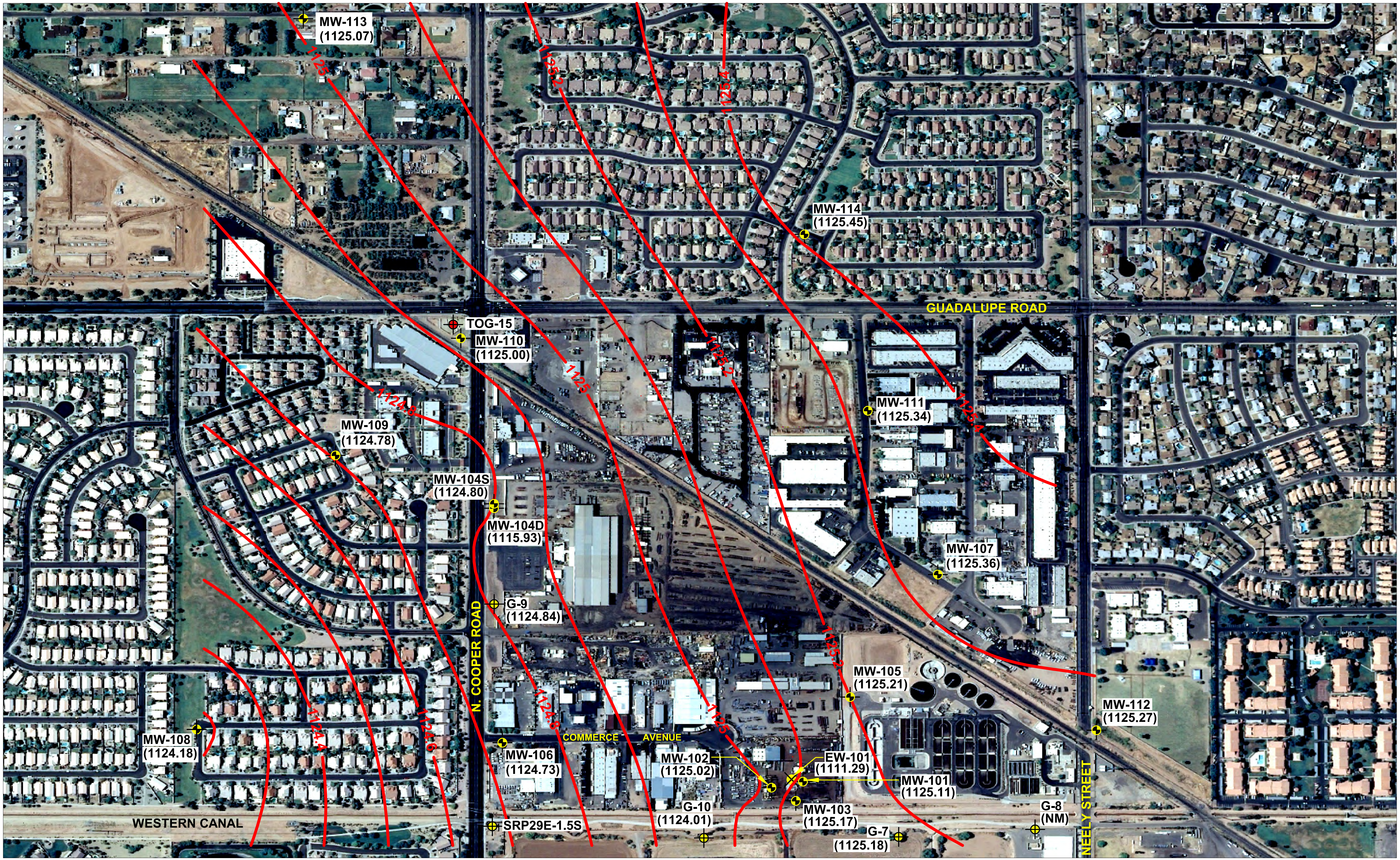
GROUNDWATER ELEVATIONS
AUGUST 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/13/11	JAA	12/13/11	2010002021A	G.8



Legend

MW-102 (1125.02)	Monitor Well and Groundwater Elevation (ft amsl)	G-7	Well With Dedicated Pump (Not Currently Pumping)
		TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)		Groundwater Contour (ft amsl)
		(NM)	Not Measured

0 400 800
SCALE IN FEET

Note: Wells MW-104D, EW-101 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken on September 27, 2011.

N

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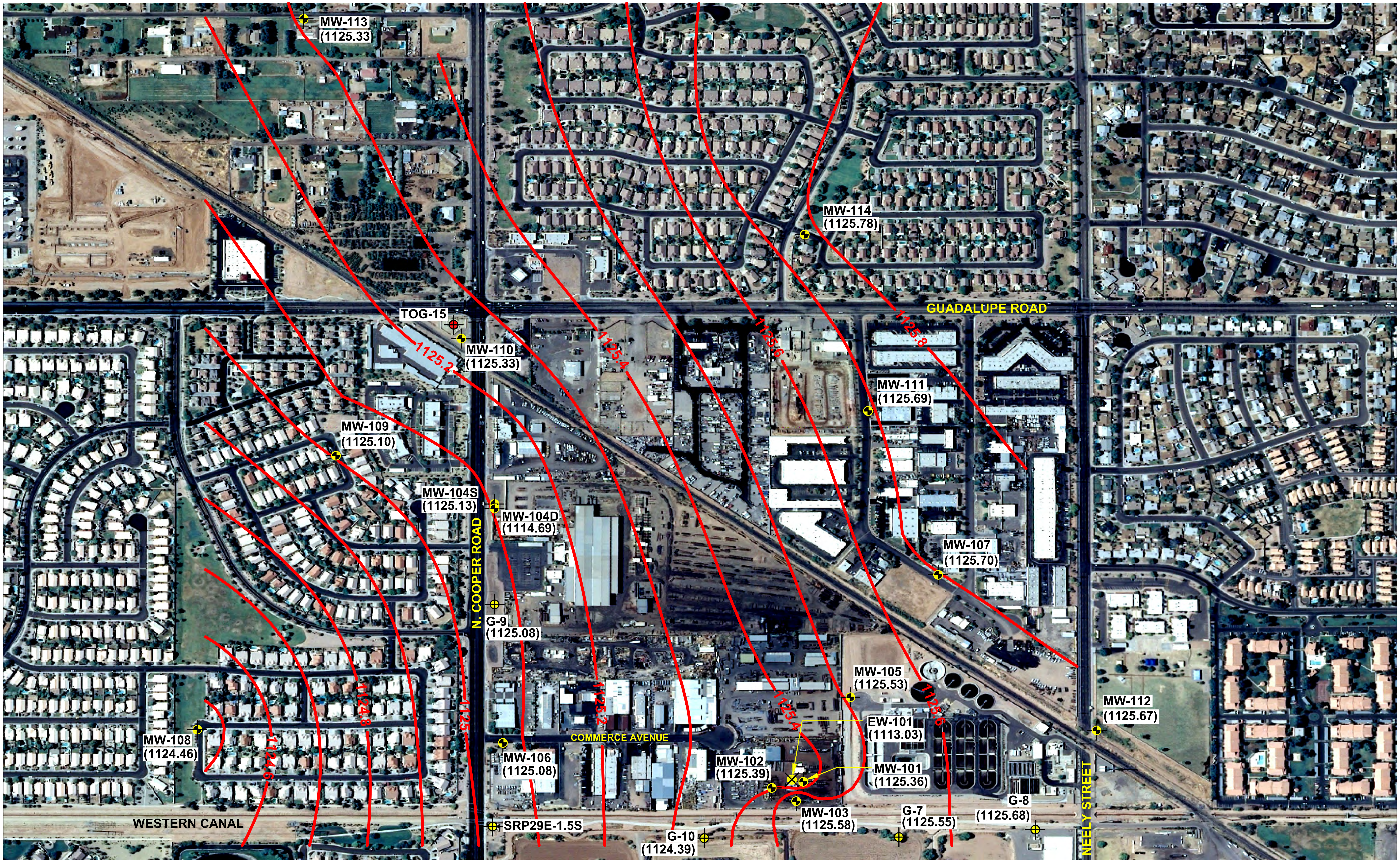
GROUNDWATER ELEVATIONS
SEPTEMBER 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/13/11	JAA	12/13/11	2010002022A	G.9



Legend

● MW-101 (1125.36)	Monitor Well and Groundwater Elevation (ft amsl)
× EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
⊕ G-7	Well With Dedicated Pump (Not Currently Pumping)
● TOG-15	Well With Dedicated Pump (Currently Pumping)
━	Groundwater Contour (ft amsl)
(NM)	Not Measured

0 400 800

SCALE IN FEET

Note: Wells EW-101, MW-104D and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken between October 10, 2011 and October 14, 2011.

N

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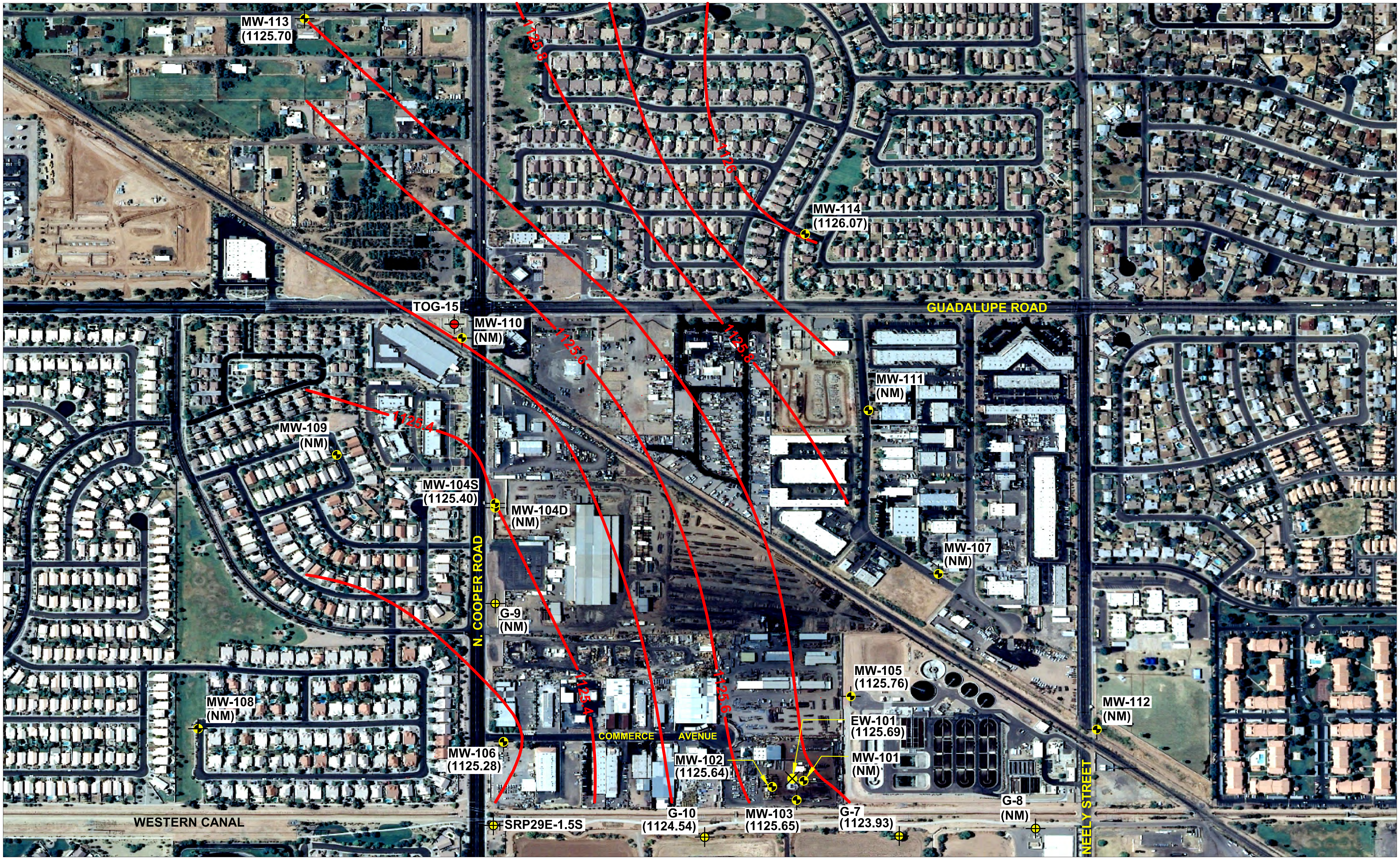
GROUNDWATER ELEVATIONS
OCTOBER 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/31/11	JAA	12/31/11	2010002017A	G.10



Legend

MW-102 (1125.64)	Monitor Well and Groundwater Elevation (ft amsl)	G-7	Well With Dedicated Pump (Not Currently Pumping)
EW-101	Extraction Well	TOG-15	Well With Dedicated Pump (Currently Pumping)
	(EW-101 Well Pump Not Operating at Time of Measurements)		Groundwater Contour (ft amsl)
		(NM)	Not Measured

0 400 800
SCALE IN FEET

Note: Wells EW-101, MW-104D, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken on November 29, 2011.

N

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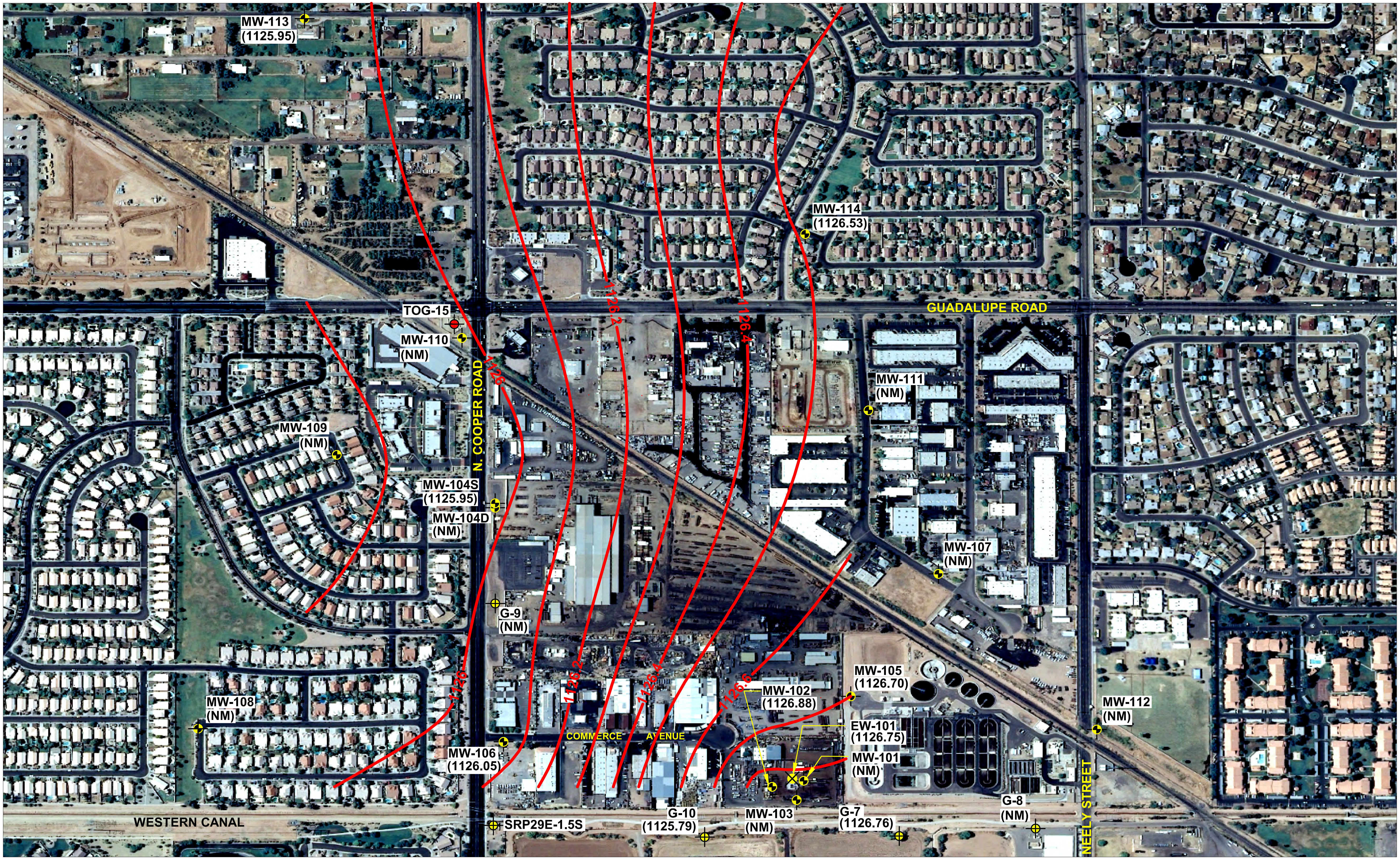
GROUNDWATER ELEVATIONS
NOVEMBER 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/31/11	JAA	12/31/11	2010002023A	G.11



Legend

MW-102 (1126.88)	Monitor Well and Groundwater Elevation (ft amsl)	G-7	Well With Dedicated Pump (Not Currently Pumping)
		TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well		Groundwater Contour (ft amsl)
	(EW-101 Well Pump Not Operating at Time of Measurements)	(NM)	Not Measured

0 400 800

SCALE IN FEET

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken on December 30, 2011.

N

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GROUNDWATER ELEVATIONS
DECEMBER 2011
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	1/4/12	JAA	1/4/12	2010002024A	G.12

Legend

MW-102 (1126.28) Monitor Well and Groundwater Elevation (ft amsl)

G-7 Well With Dedicated Pump (Not Currently Pumping)

TOG-15 Well With Dedicated Pump (Currently Pumping)

EW-101 Extraction Well
(EW-101 Well Pump Not Operating at Time of Measurement)

Groundwater Contour (ft amsl)

(NM) Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken between 1/24/12 and 1/30/12.

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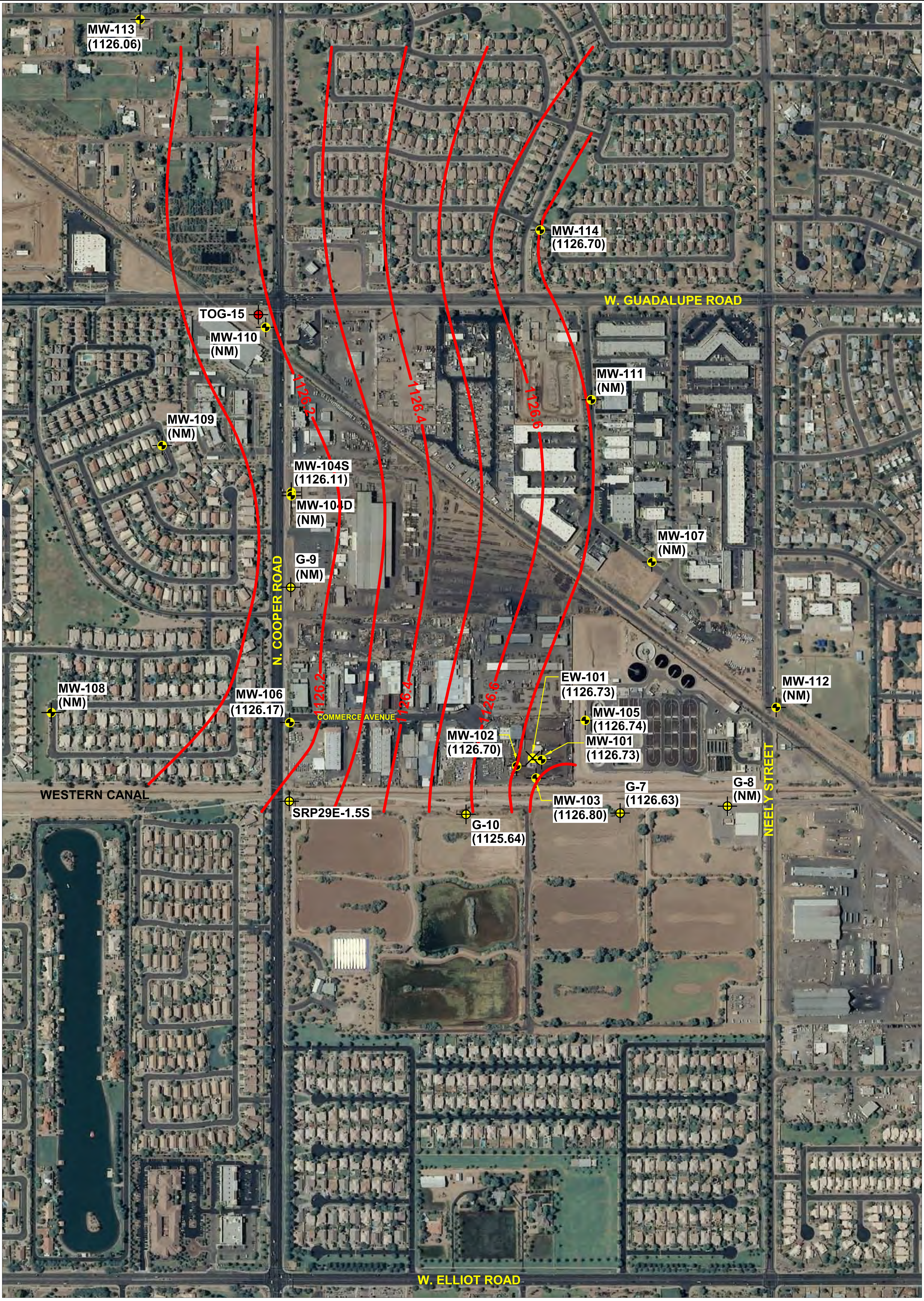
GROUNDWATER ELEVATIONS
JANUARY 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	2/28/12	JAA	2/28/12	2010002026A	G.13



Legend

MW-102 (1126.70)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Not Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 2/28/12.

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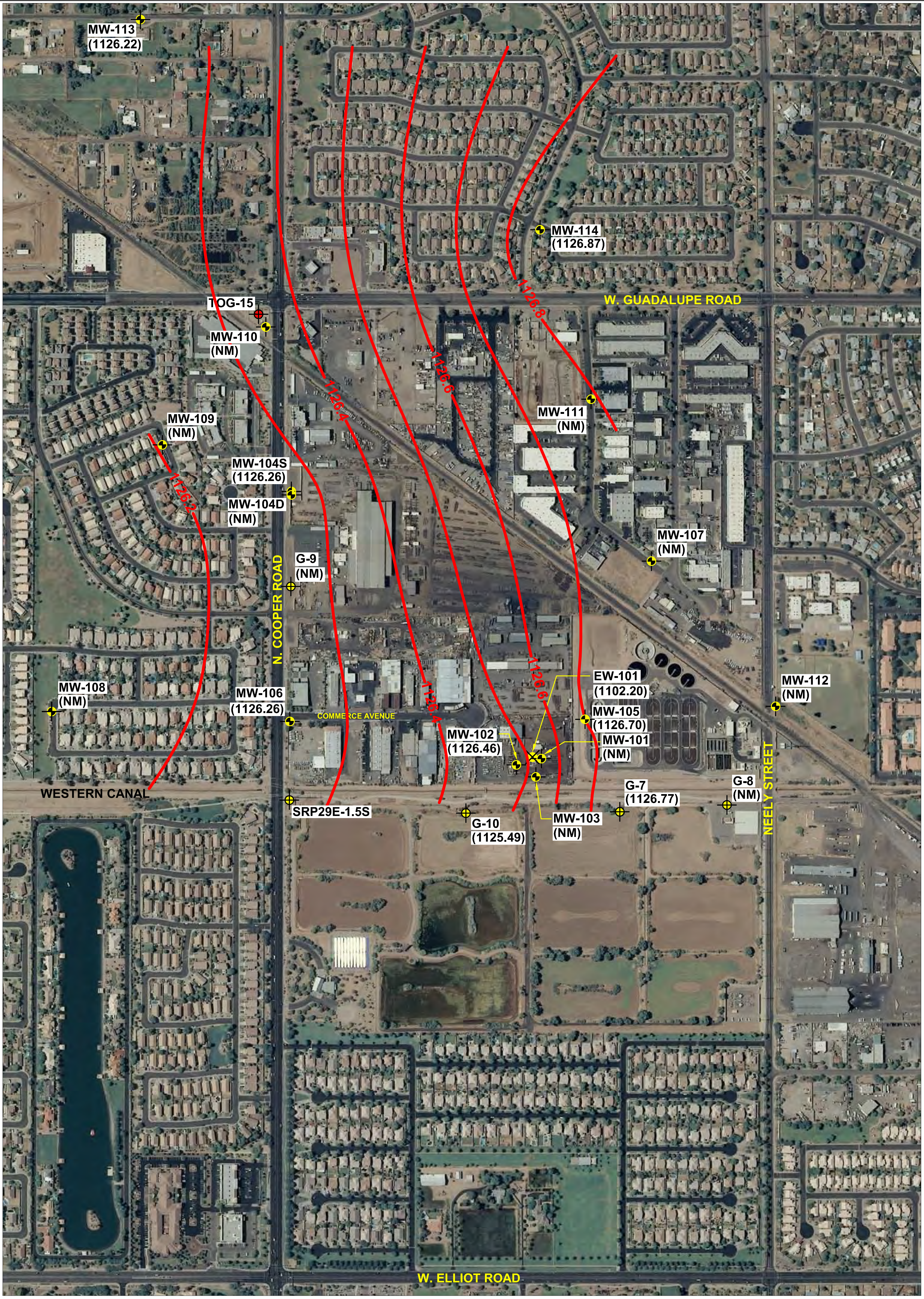
GROUNDWATER ELEVATIONS
FEBRUARY 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	3/9/12	JAA	3/9/12	2010002028A	G.14



Legend

MW-102 (1126.46) Monitor Well and Groundwater Elevation (ft amsl)

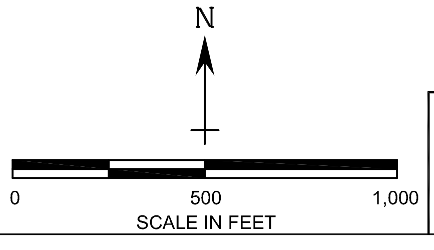
G-7 Well With Dedicated Pump (Not Currently Pumping)

TOG-15 Well With Dedicated Pump (Currently Pumping)

EW-101 Extraction Well (EW-101 Well Pump Operating at Time of Measurement)

Groundwater Contour (ft amsl)

(NM) Not Measured



Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 3/23/12.

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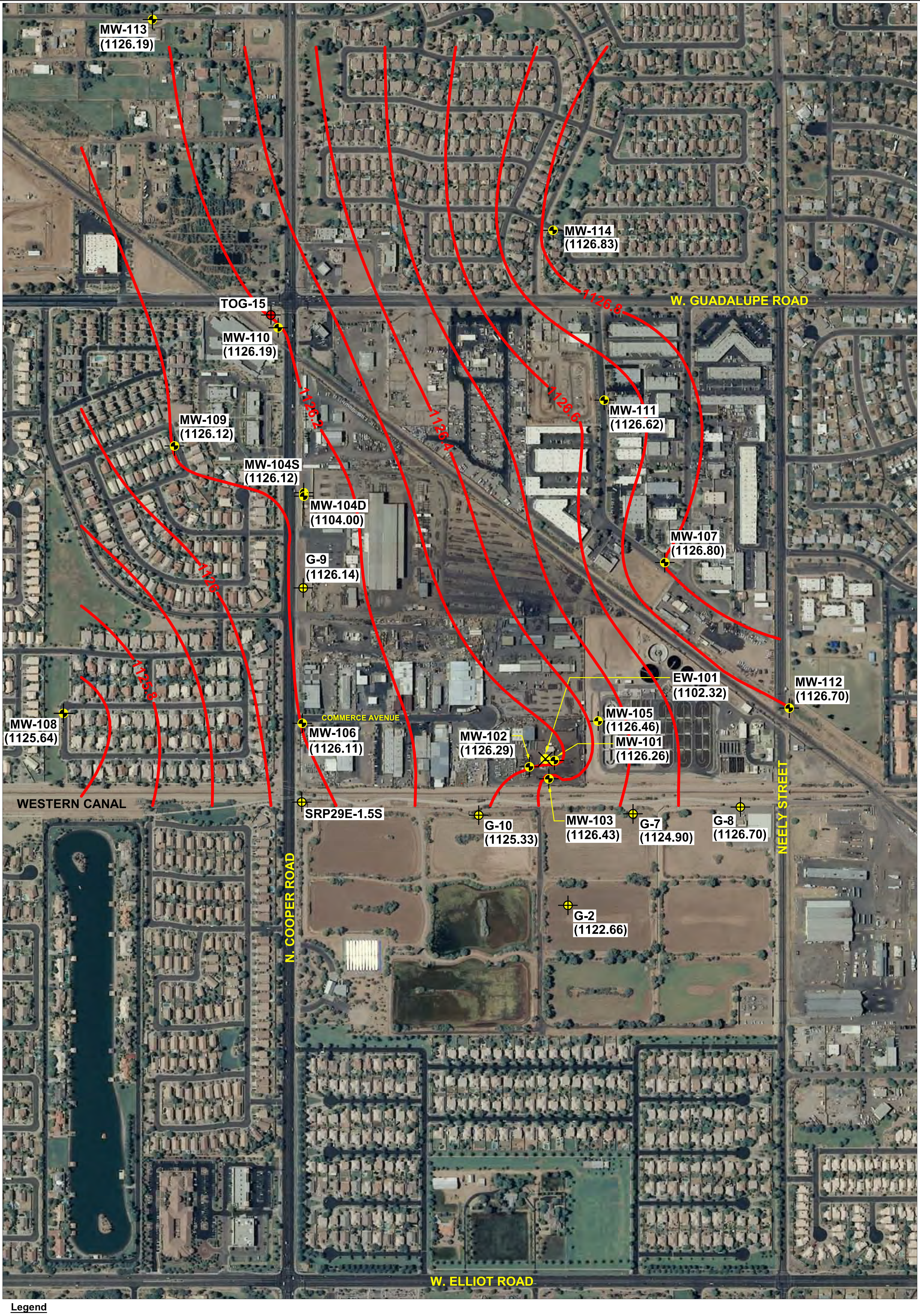
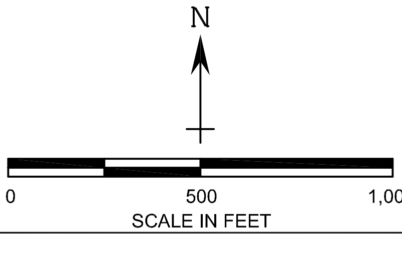
GROUNDWATER ELEVATIONS
MARCH 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	3/31/12	JAA	3/31/12	2010002029A	G.15



Legend

MW-102 (1126.29)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured



Note: Wells MW-104D, EW-101, G-2, G-7, G-8 and G-10
not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken between 4/24/12 and 4/28/12.

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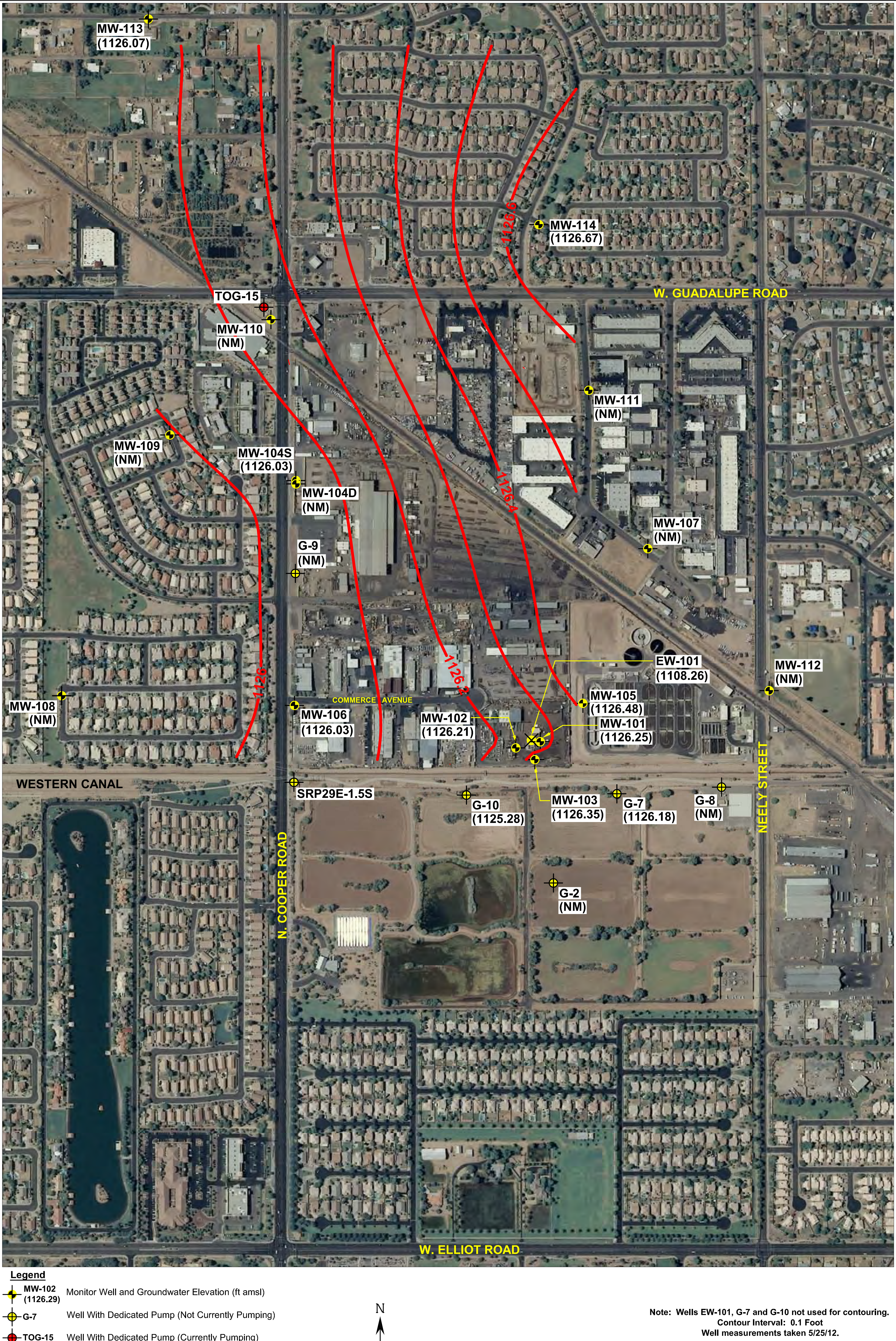
GROUNDWATER ELEVATIONS
APRIL 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	5/29/12	JAA	5/29/12	2010002030A	G.16



Legend

MW-102 (1126.29)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 5/25/12.

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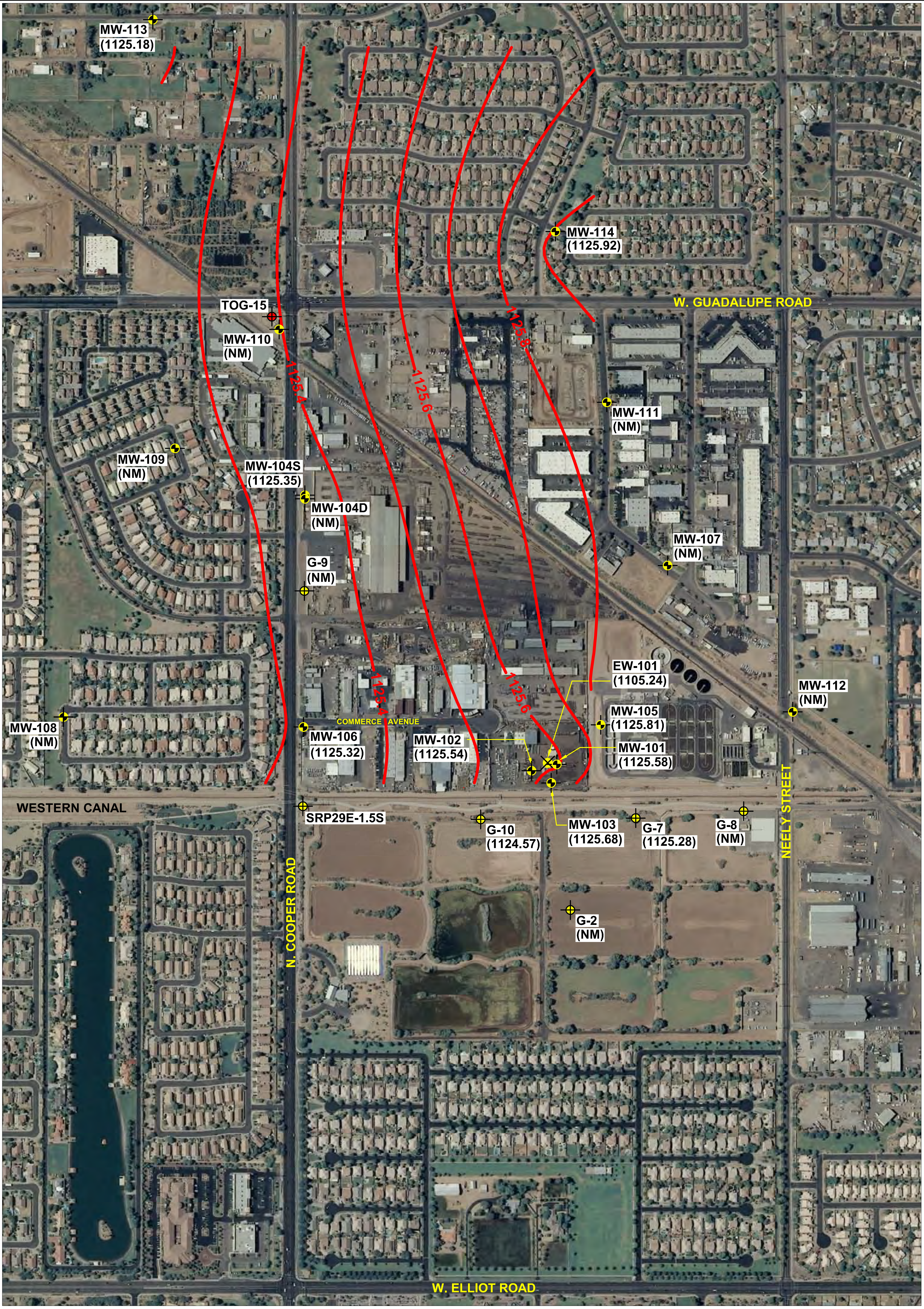
GROUNDWATER ELEVATIONS
MAY 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	5/30/12	JAA	5/30/12	2010002031A	G.17



Legend

MW-102 (1125.54) Monitor Well and Groundwater Elevation (ft amsl)

G-7 Well With Dedicated Pump (Not Currently Pumping)

TOG-15 Well With Dedicated Pump (Currently Pumping)

EW-101 Extraction Well
(EW-101 Well Pump Operating at Time of Measurement)

Groundwater Contour (ft amsl)

(NM) Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 6/29/12.

HYDRO
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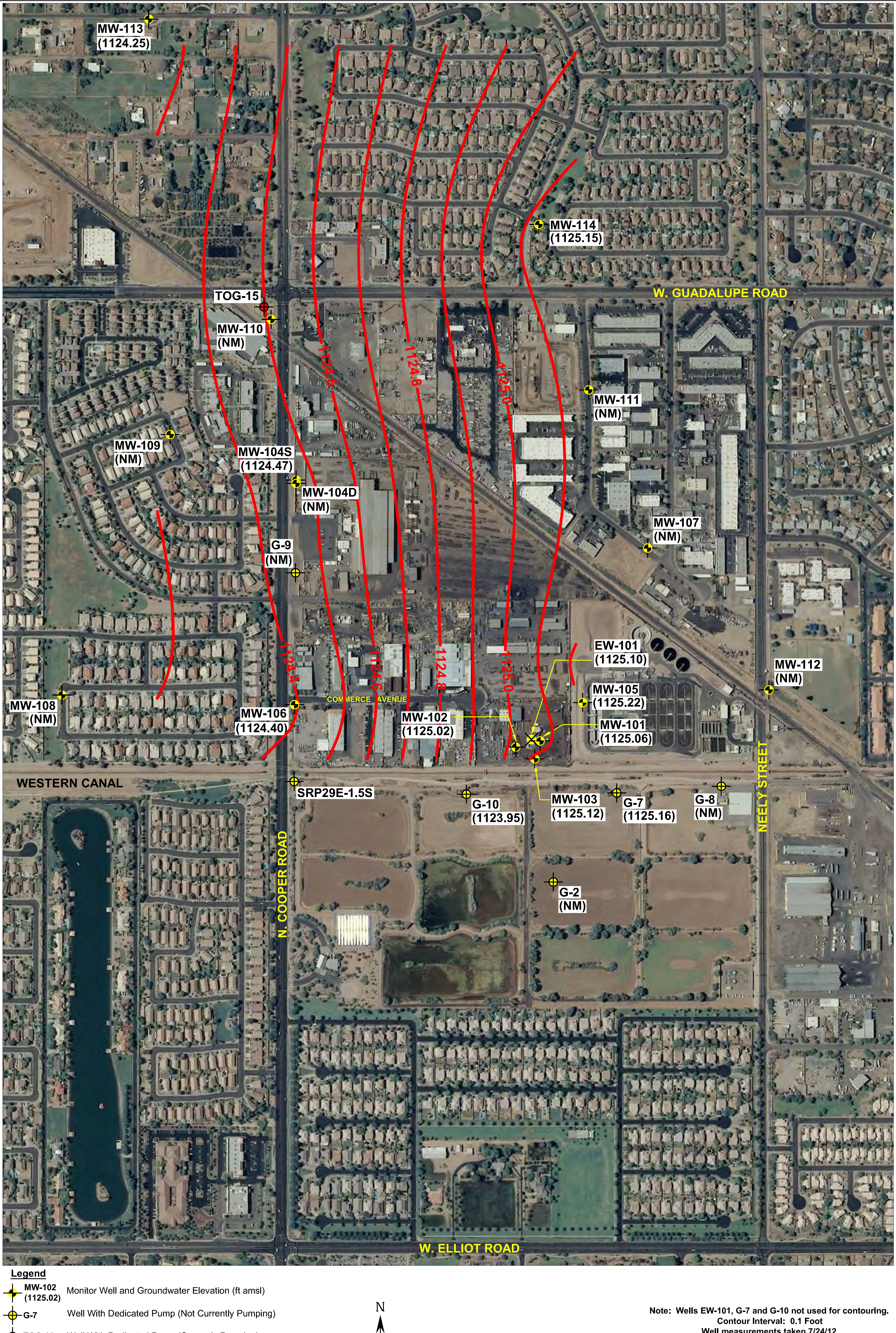
CHEM, INC.

GROUNDWATER ELEVATIONS
JUNE 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	7/11/12	JAA	7/11/12	2010002035A	G.18



Legend

MW-102 (1125.02)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Not Operating at Time of Measurement)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-7 and G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 7/24/12.

HYDRO
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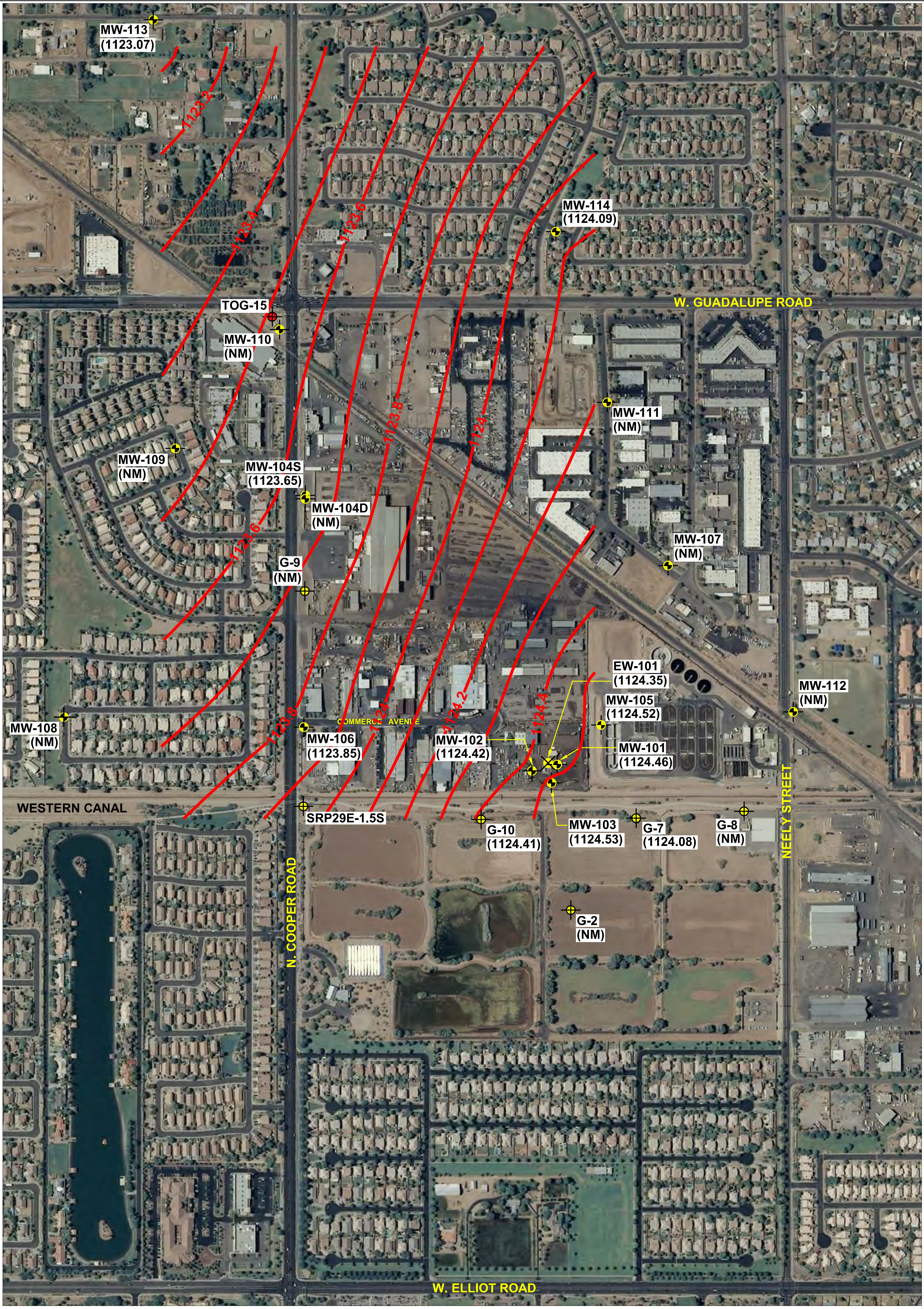
GROUNDWATER ELEVATIONS
JULY 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	8/03/12	JAA	8/03/12	2010002036A	G.19



Legend

●	MW-102 (1124.42)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	G-7	Well With Dedicated Pump (Not Currently Pumping)
⊕	TOG-15	Well With Dedicated Pump (Currently Pumping)
✕	EW-101	Extraction Well (EW-101 Well Pump Not Operating at Time of Measurement)
—		Groundwater Contour (ft amsl)
(NM)		Not Measured

N

0 500 1,000

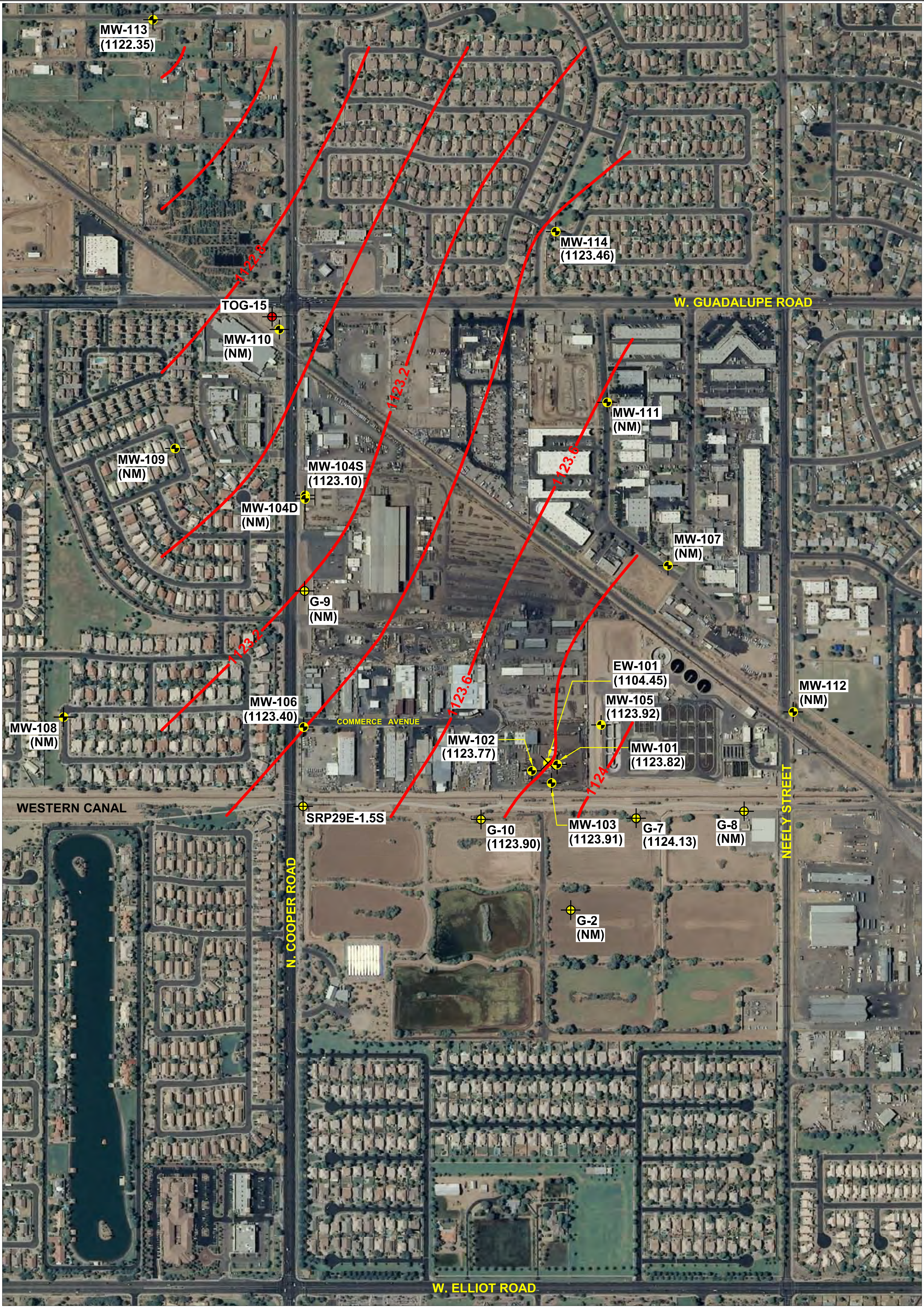
SCALE IN FEET

Note: Wells EW-101 and G-7 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken 8/27/12.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
AUGUST 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	9/04/12	JAA	9/04/12	2010002037A	G.20



Legend

- MW-102 (1123.77) Monitor Well and Groundwater Elevation (ft amsl)
- G-7 Well With Dedicated Pump (Not Currently Pumping)
- TOG-15 Well With Dedicated Pump (Currently Pumping)
- EW-101 Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
- Groundwater Contour (ft amsl)
- (NM) Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken 9/25/12.

HYDRO
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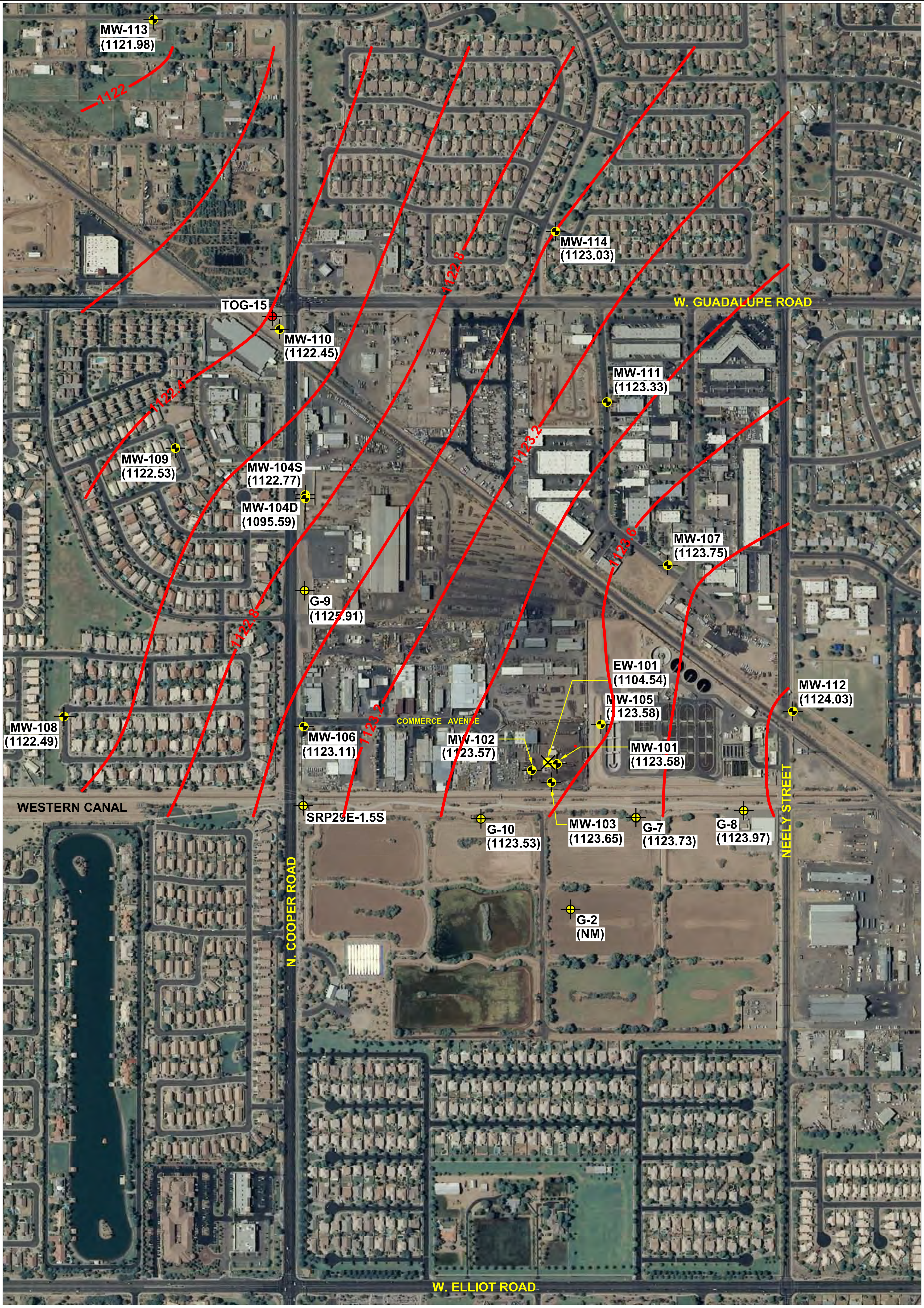
GROUNDWATER ELEVATIONS
SEPTEMBER 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	9/28/12	JAA	9/28/12	2010002039A	G.21



Legend

MW-102 (1123.57)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

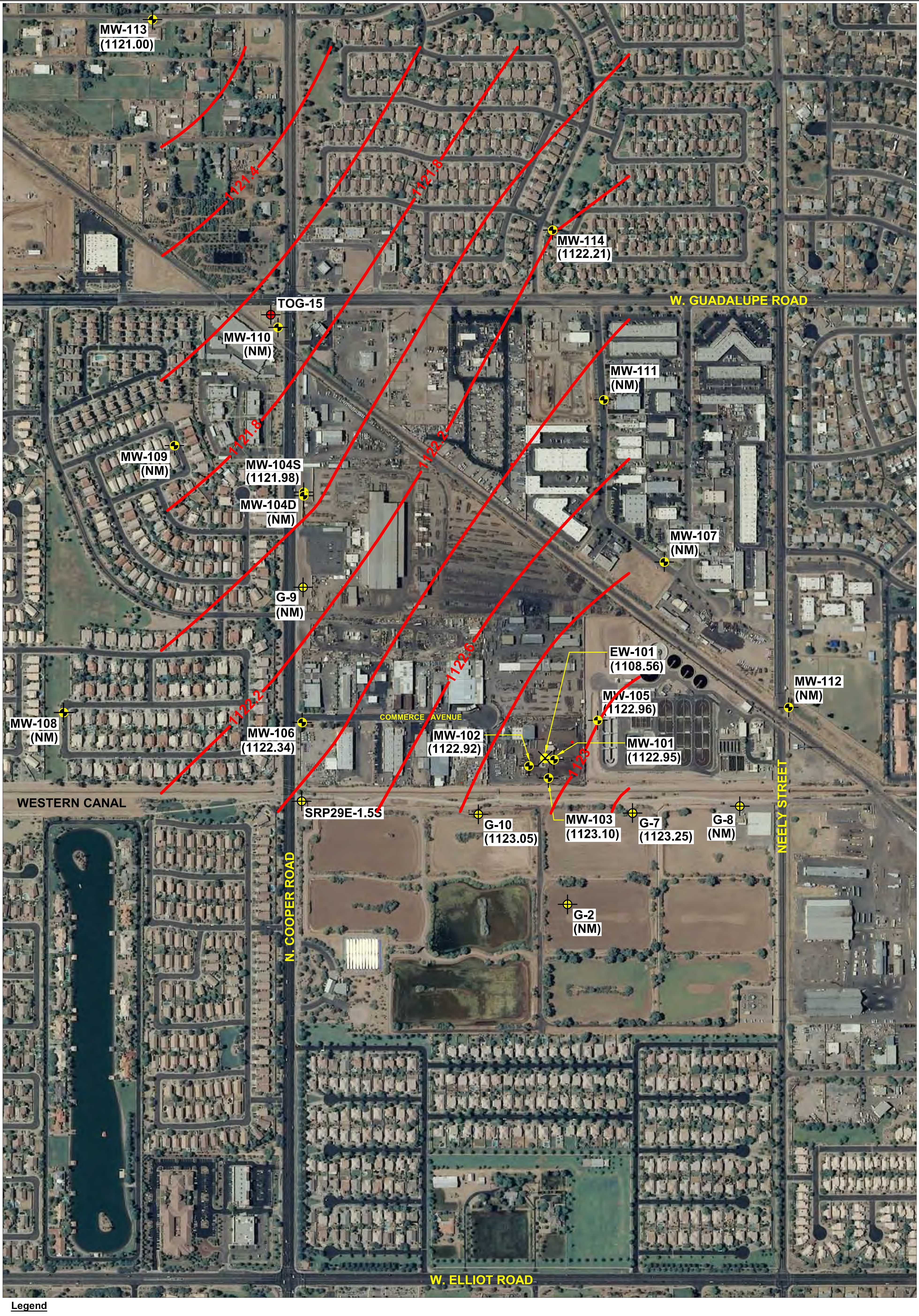
0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-9, G-10, MW-103 and MW-104D not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken between October 9, 2012 and October 12, 2012.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
OCTOBER 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	11/30/12	JAA	11/30/12	2010002042A	G.22



Legend

MW-102 (1122.92)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-10 and MW-103 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken November 29, 2012.

HYDRO
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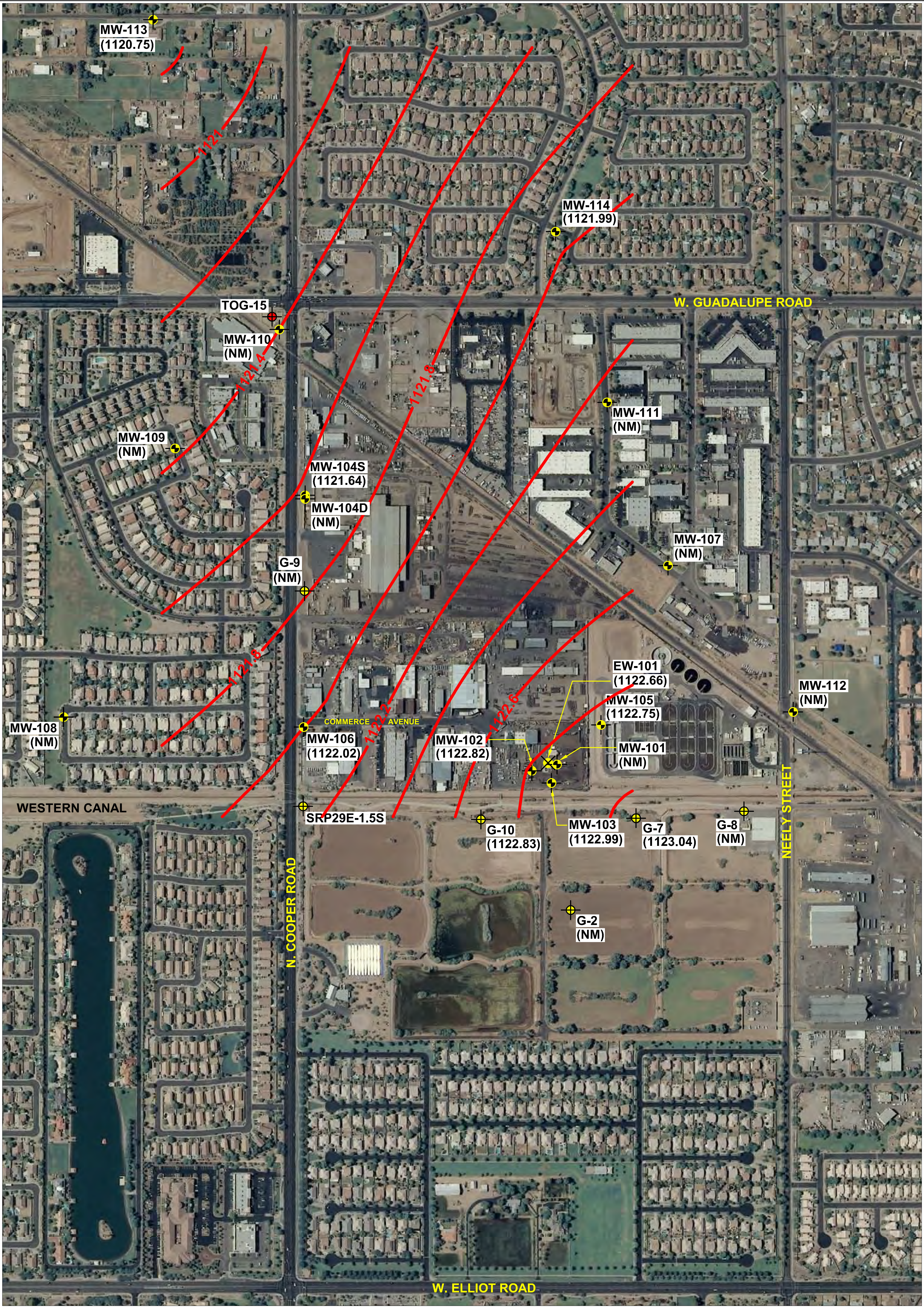
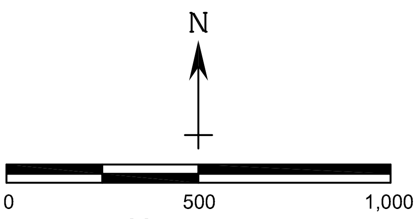
GROUNDWATER ELEVATIONS
NOVEMBER 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	12/31/12	JAA	12/31/12	2010002045A	G.23



Legend

MW-102 (1124.42)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Not Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured



Note: Wells EW-101, G-10 and MW-103 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken December 27, 2012.

HYDRO
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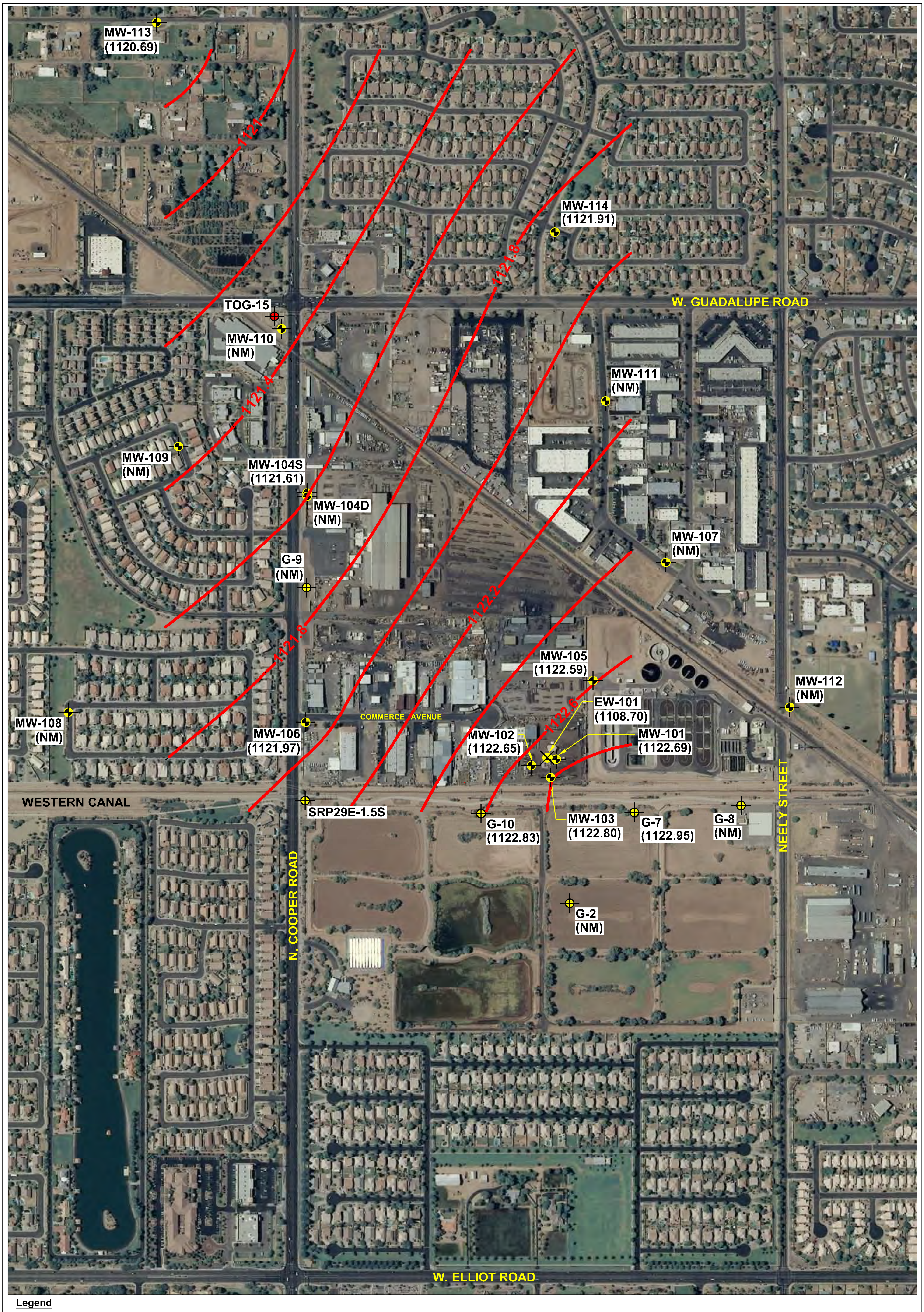
GROUNDWATER ELEVATIONS
DECEMBER 2012
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	1/14/13	JAA	1/14/13	2010002047A	G.24



Legend

MW-102 (1122.65) Monitor Well and Groundwater Elevation (ft amsl)

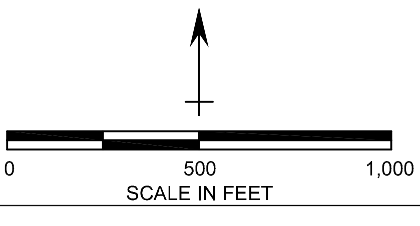
G-7 Well With Dedicated Pump (Not Currently Pumping)

TOG-15 Well With Dedicated Pump (Currently Pumping)

EW-101 Extraction Well
(EW-101 Well Pump Operating at Time of Measurement)

Groundwater Contour (ft amsl)

(NM) Not Measured

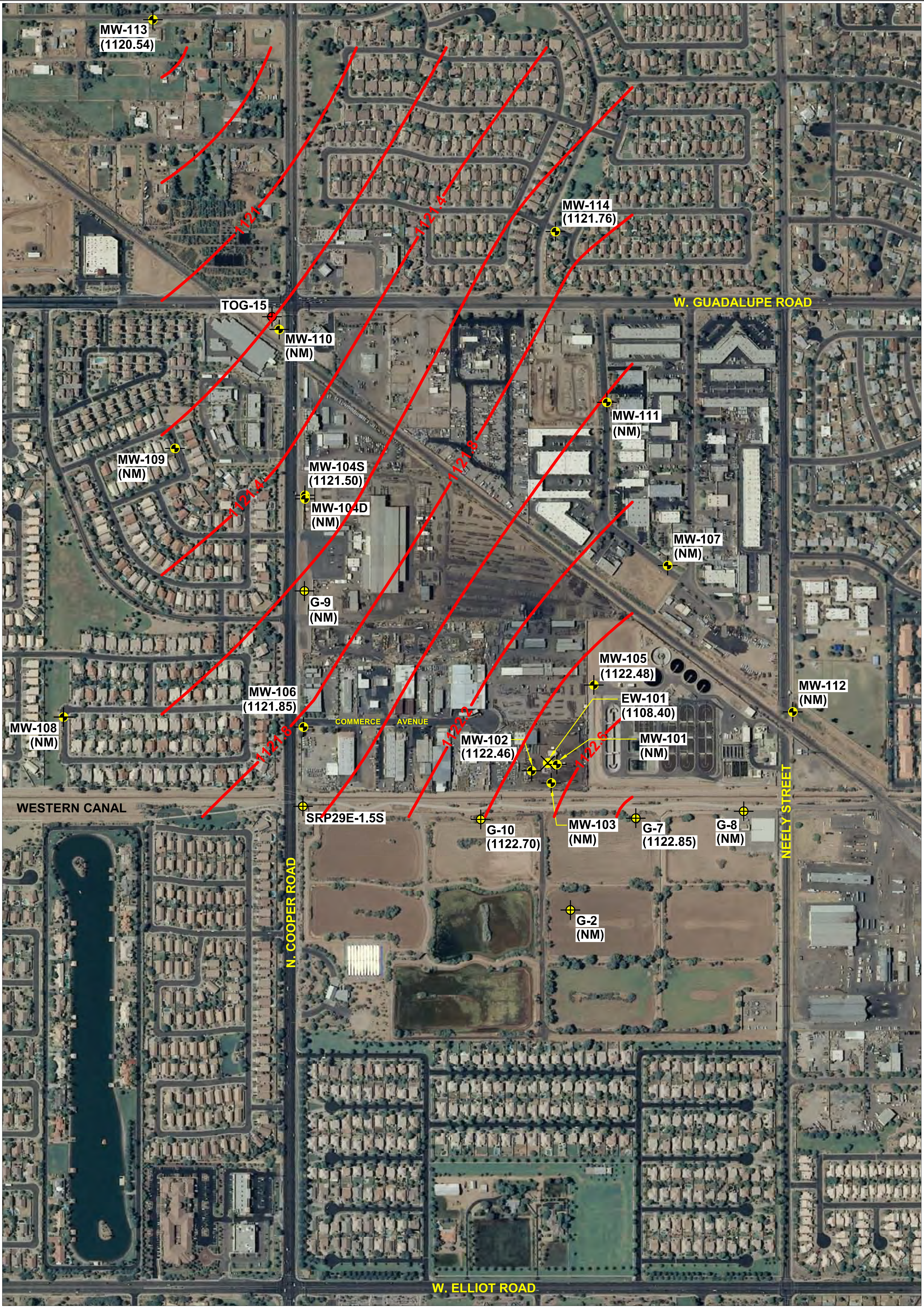


Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken January 31, 2013.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
JANUARY 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	2/15/13	JAA	2/15/13	2010002049A	G.25



Legend

MW-102 (1122.46)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken February 21, 2013.

HYDRO
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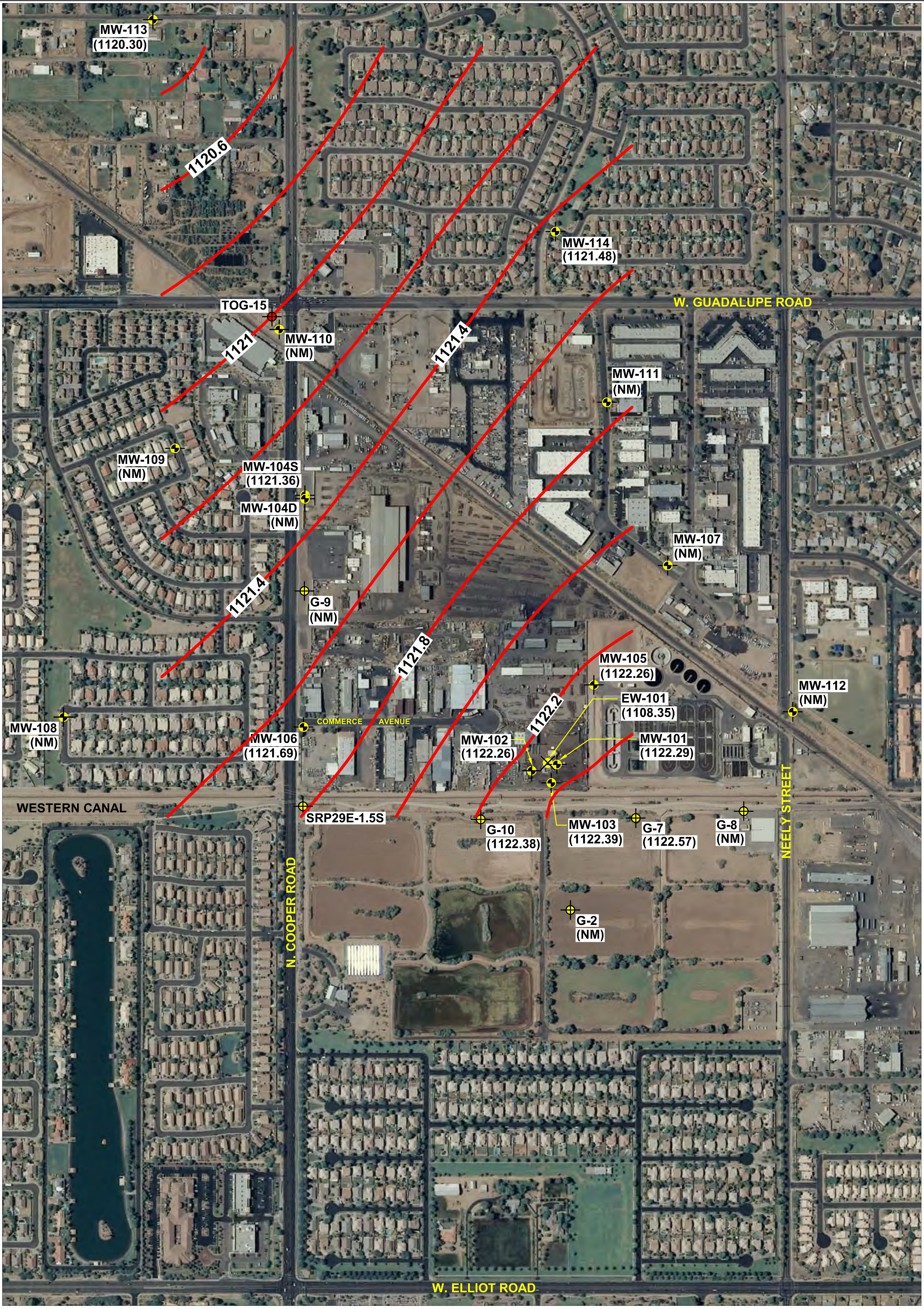
GROUNDWATER ELEVATIONS
FEBRUARY 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	3/15/13	JAA	3/15/13	2010002052A	G.26



Legend

- MW-102 (1122.26) — Monitor Well and Groundwater Elevation (ft amsl)
- G-7 — Well With Dedicated Pump (Not Currently Pumping)
- TOG-15 — Well With Dedicated Pump (Currently Pumping)
- EW-101 — Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
- Groundwater Contour (ft amsl)
- (NM) — Not Measured

N

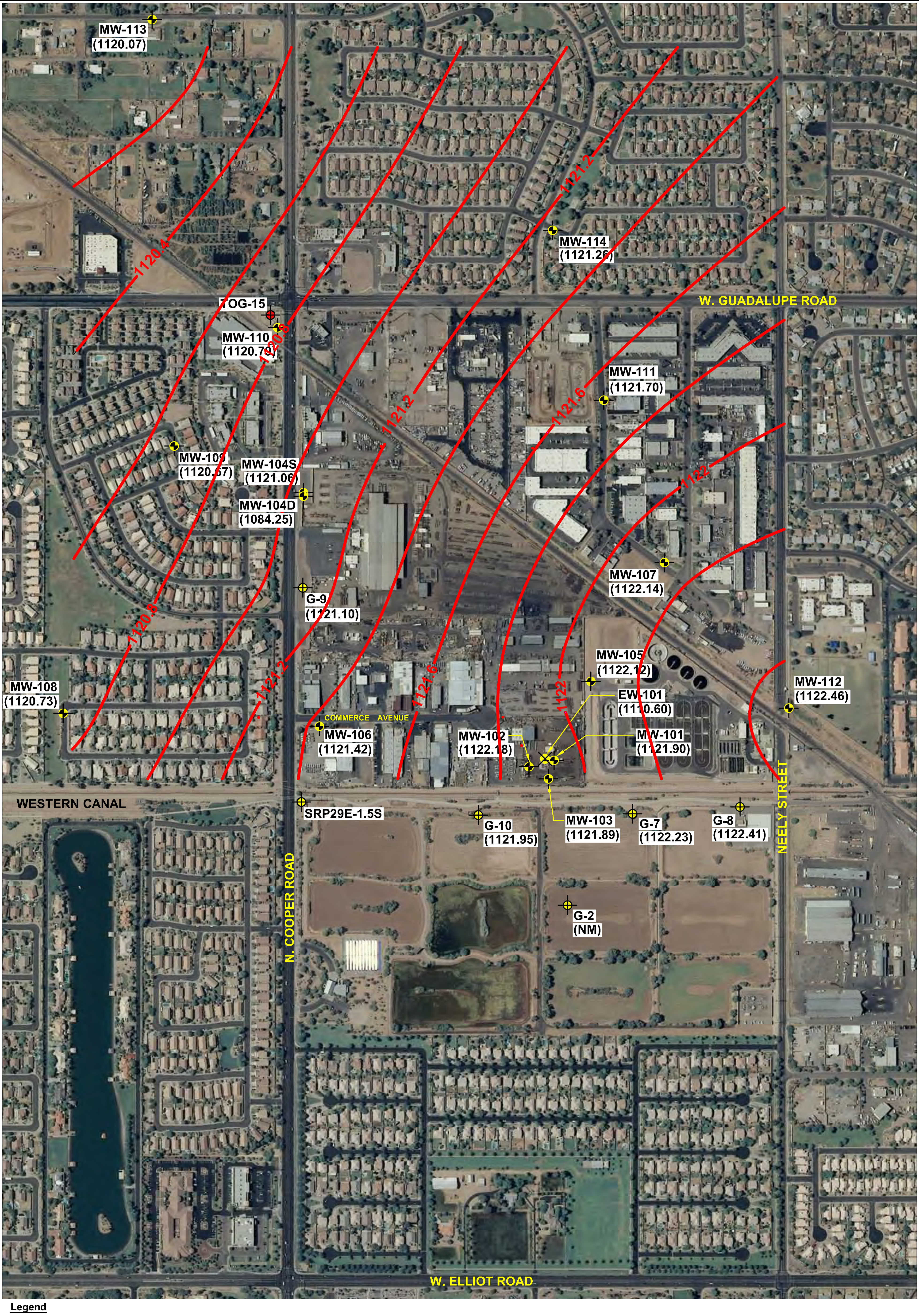
0 500 1,000
SCALE IN FEET

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken March 29, 2013.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
MARCH 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	4/1/13	JAA	4/1/13	2010002054A	G.27



Legend

MW-102 (1122.18)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Wells EW-101, G-7, G-8, G-10, MW-102 and MW-104D
not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken between April 16, 2013 and April 19, 2013.

HYDRO
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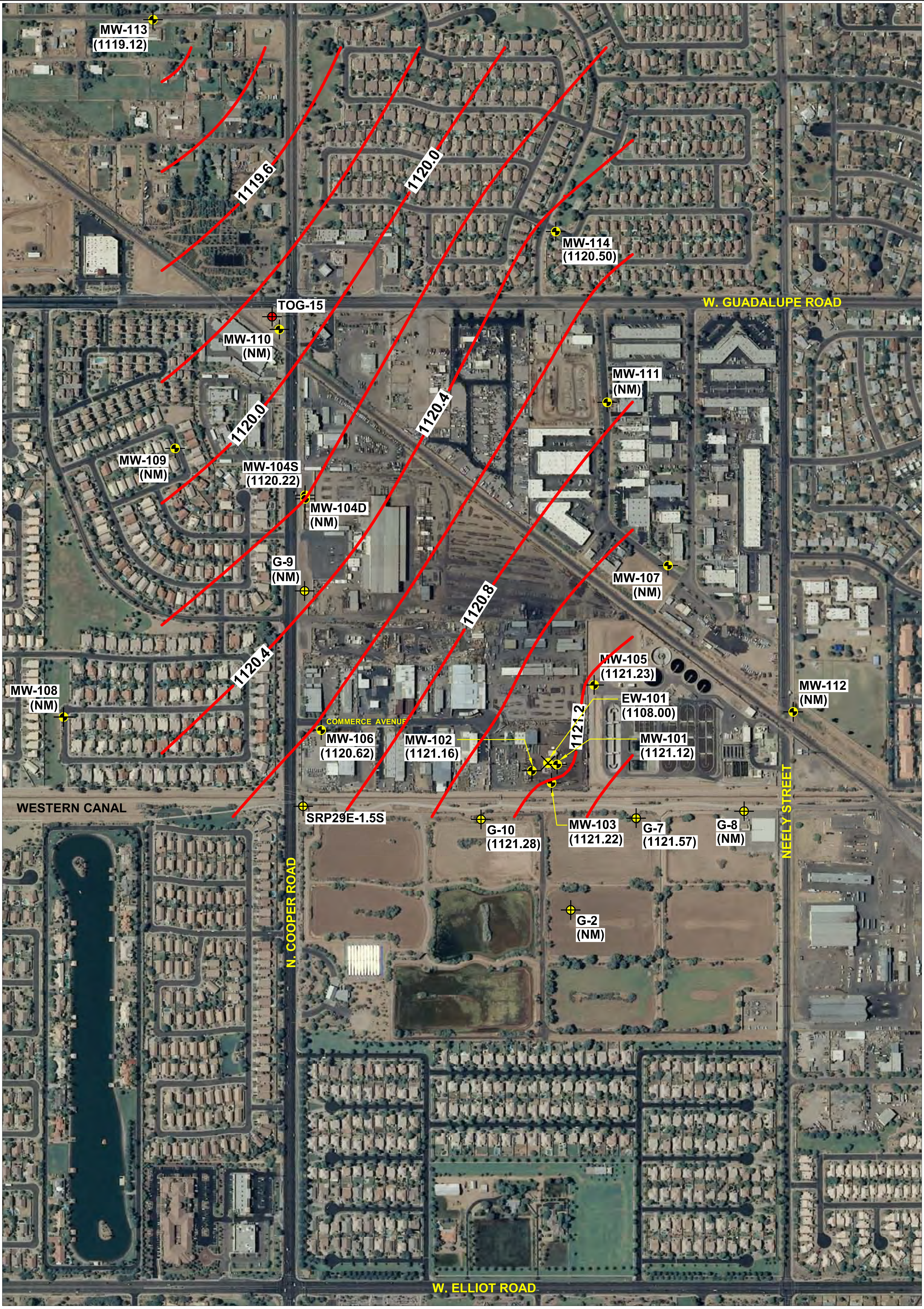
GROUNDWATER ELEVATIONS
APRIL 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	5/1/13	JAA	5/1/13	2010002055A	G.28



Legend

MW-102 (1121.16)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

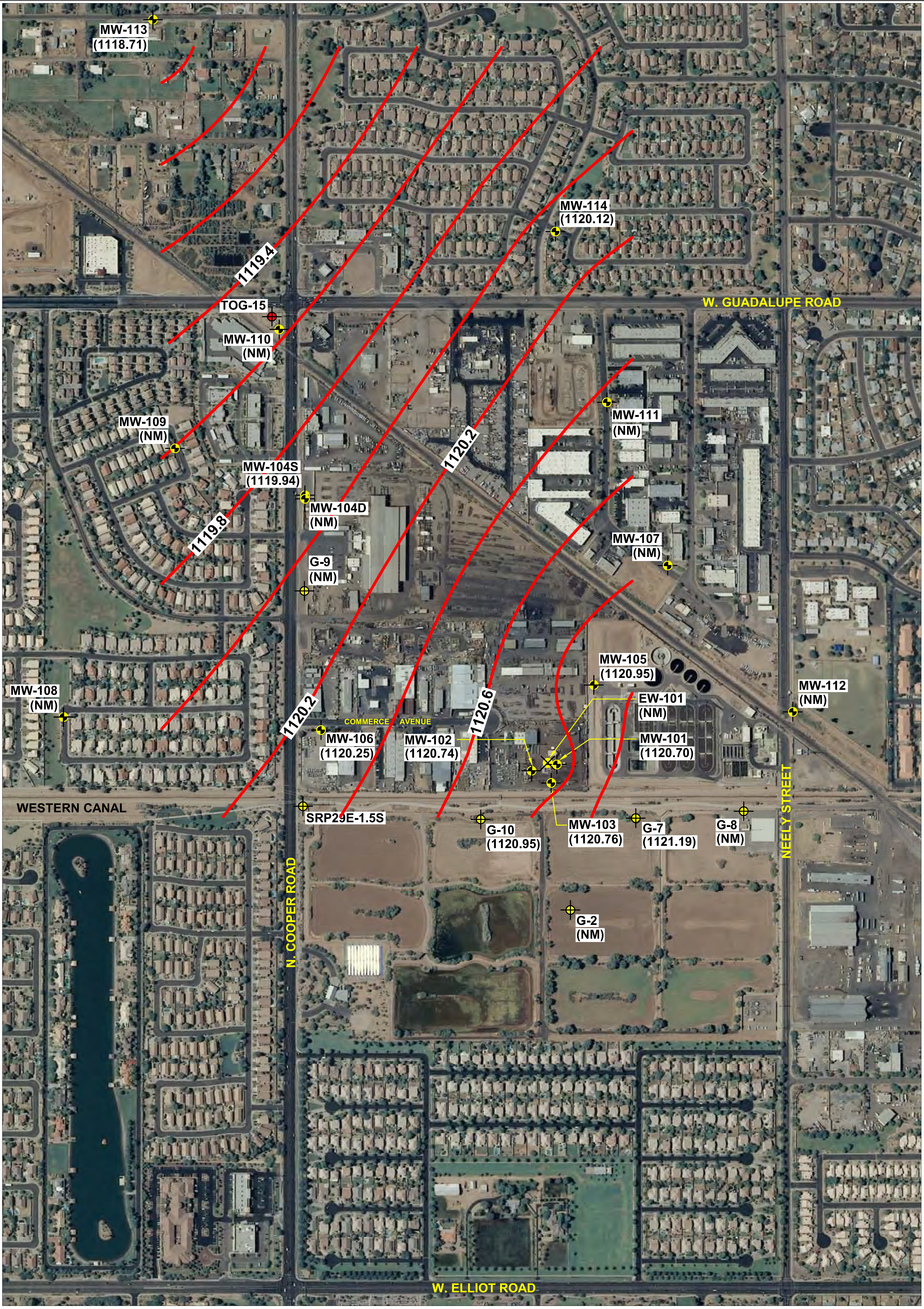
0 500 1,000
SCALE IN FEET

Note: Wells EW-101 and G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken May 31, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
MAY 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	6/5/13	JAA	6/5/13	2010002056A	G.29



Legend

MW-102 (1120.74)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
✕ EW-101	Extraction Well (EW-101 Well Pump Not Operating at Time of Measurement)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 500 1,000
SCALE IN FEET

Note: Well G-10 not used for contouring.
Contour Interval: 0.2 Foot
Well measurements taken June 28 and 29, 2013.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
JUNE 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
CLJ	7/12/13	JAA	7/12/13	2010002058A	G.30

Legend

MW-102 (1120.33)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
✕ EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
▬	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

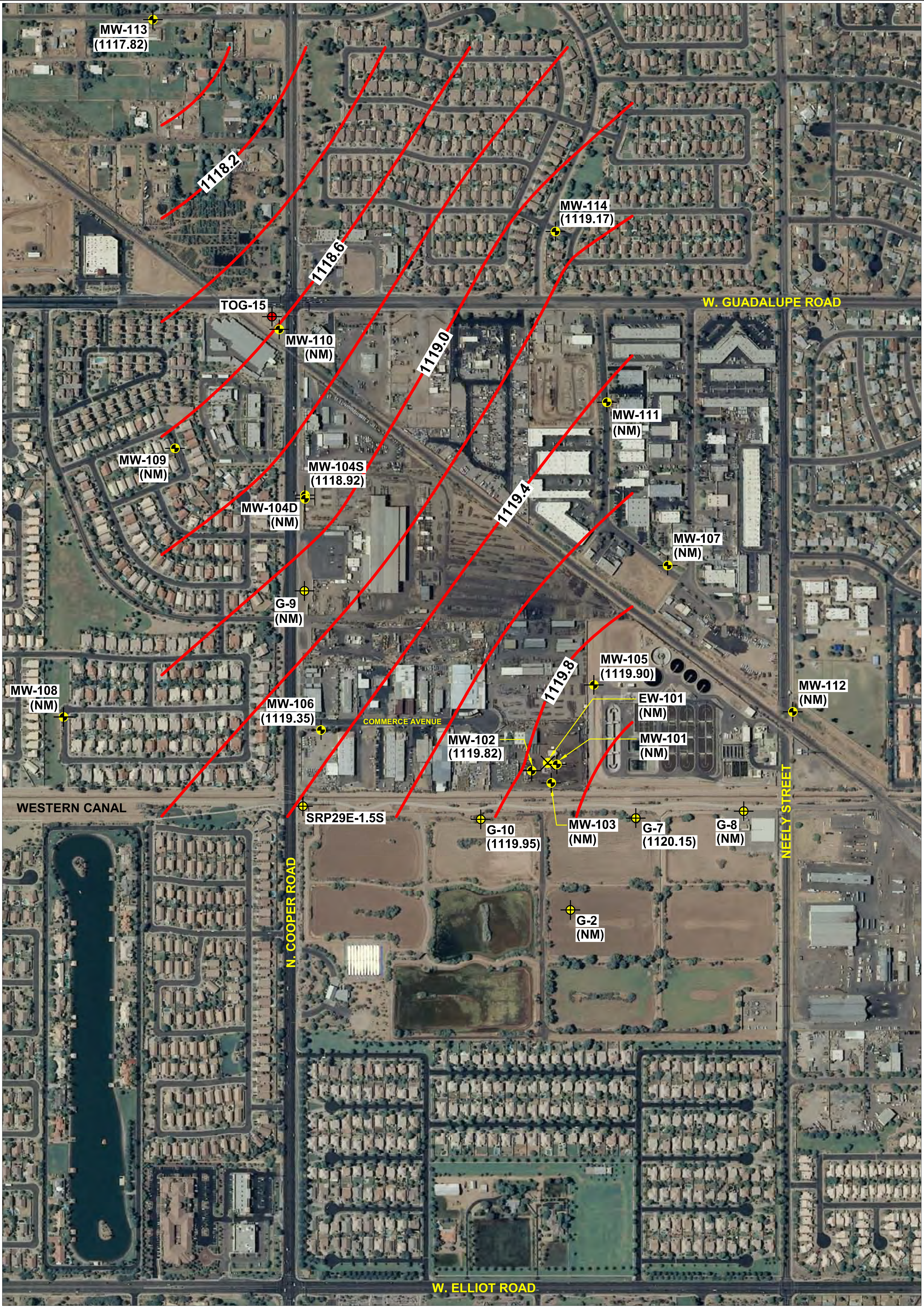
0 500 1,000
SCALE IN FEET

Note: Well G-10 not used for contouring.
Contour Interval: 0.1 Foot
Well measurements taken July 15 and 16, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
JULY 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	9/30/13	JAA	9/30/13	2010002063A	G.31



Legend

MW-102 (1119.82)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

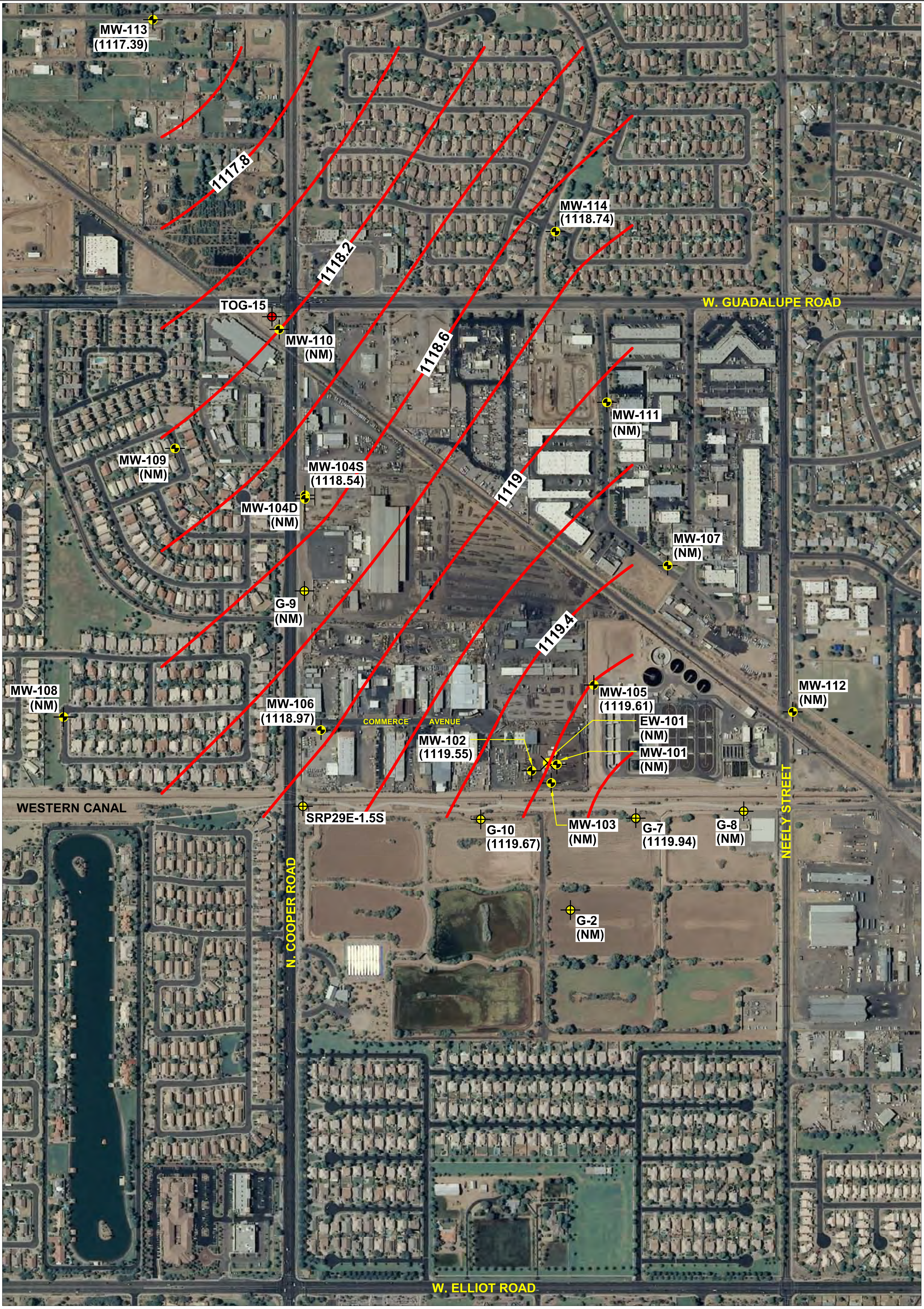
0 500 1,000
SCALE IN FEET

Note: Well G-10 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken August 28, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
AUGUST 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	9/30/13	JAA	9/30/13	2010002065A	G.32



Legend

MW-102 (1119.55)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

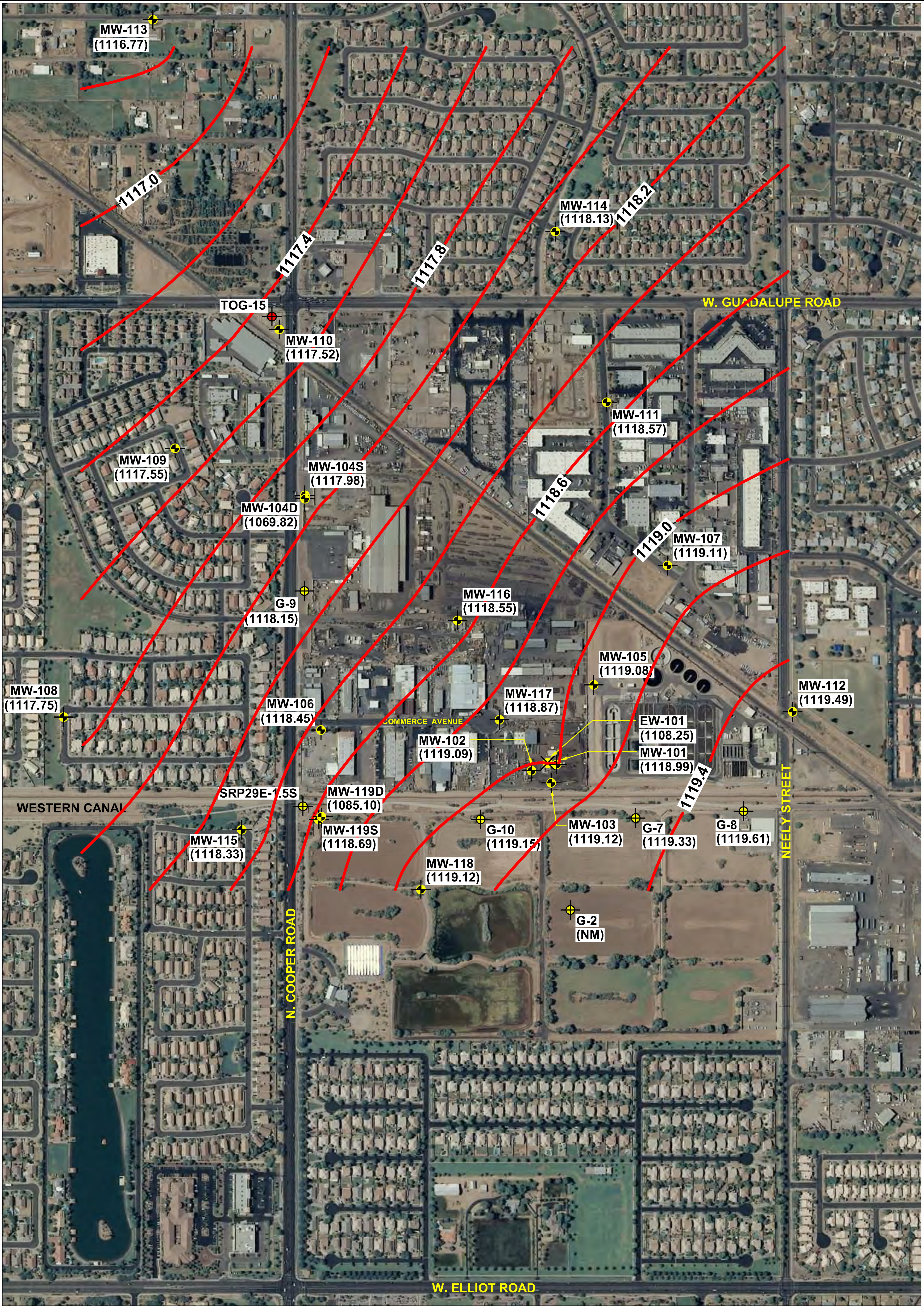
0 500 1,000
SCALE IN FEET

Note: Well G-10 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken September 25, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
SEPTEMBER 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	9/30/13	JAA	9/30/13	2010002066A	G.33



Legend

MW-102 (1119.55)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
▬	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

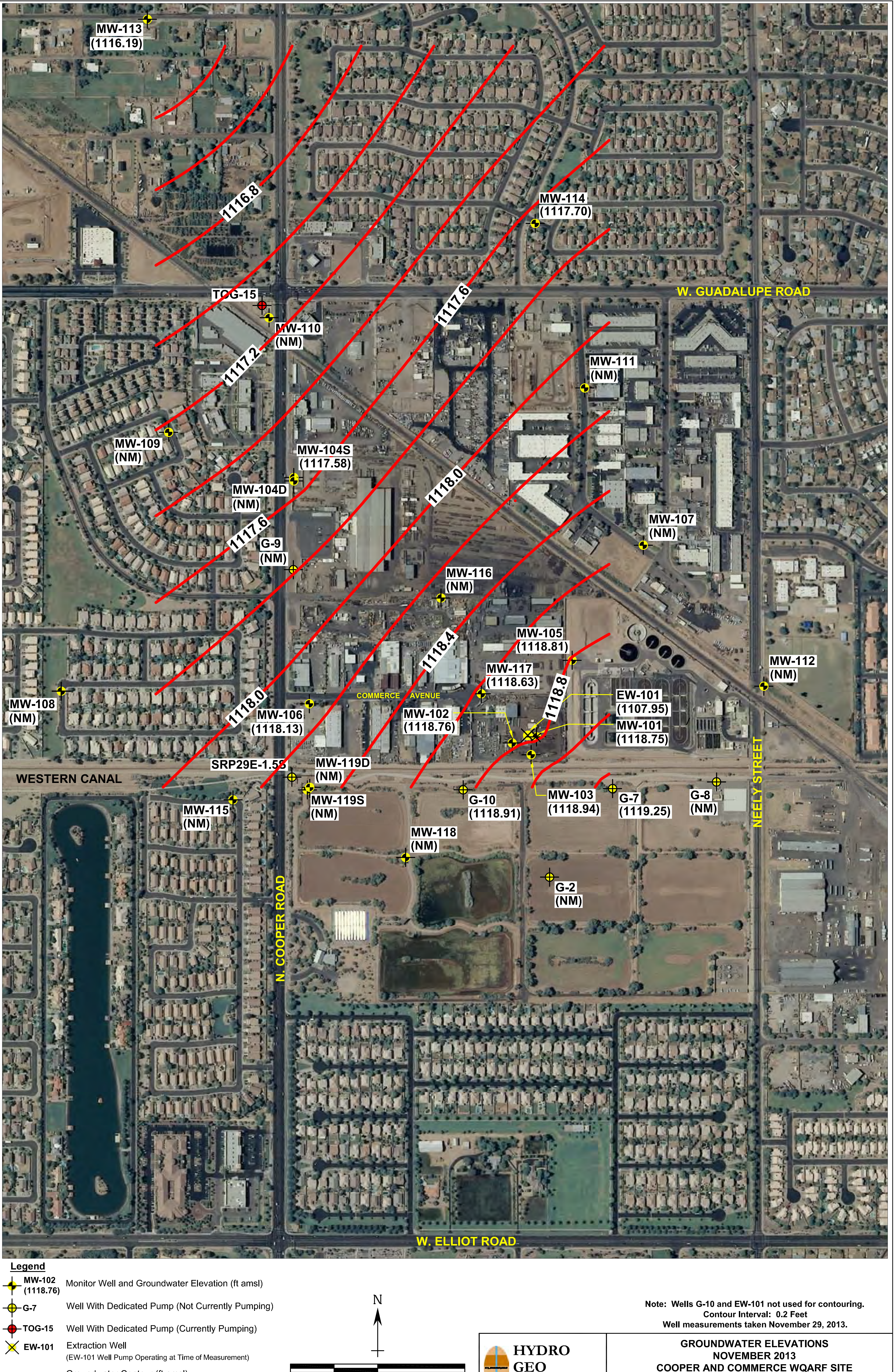
0 500 1,000
SCALE IN FEET

Note: Well G-8, G-10, EW-101, MW-102, MW-104D and MW-119D
not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken between October 17, 2013 and October 25, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
OCTOBER 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	11/30/13	JAA	11/30/13	2010002068A	G.34



Legend

MW-102 (1118.76)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

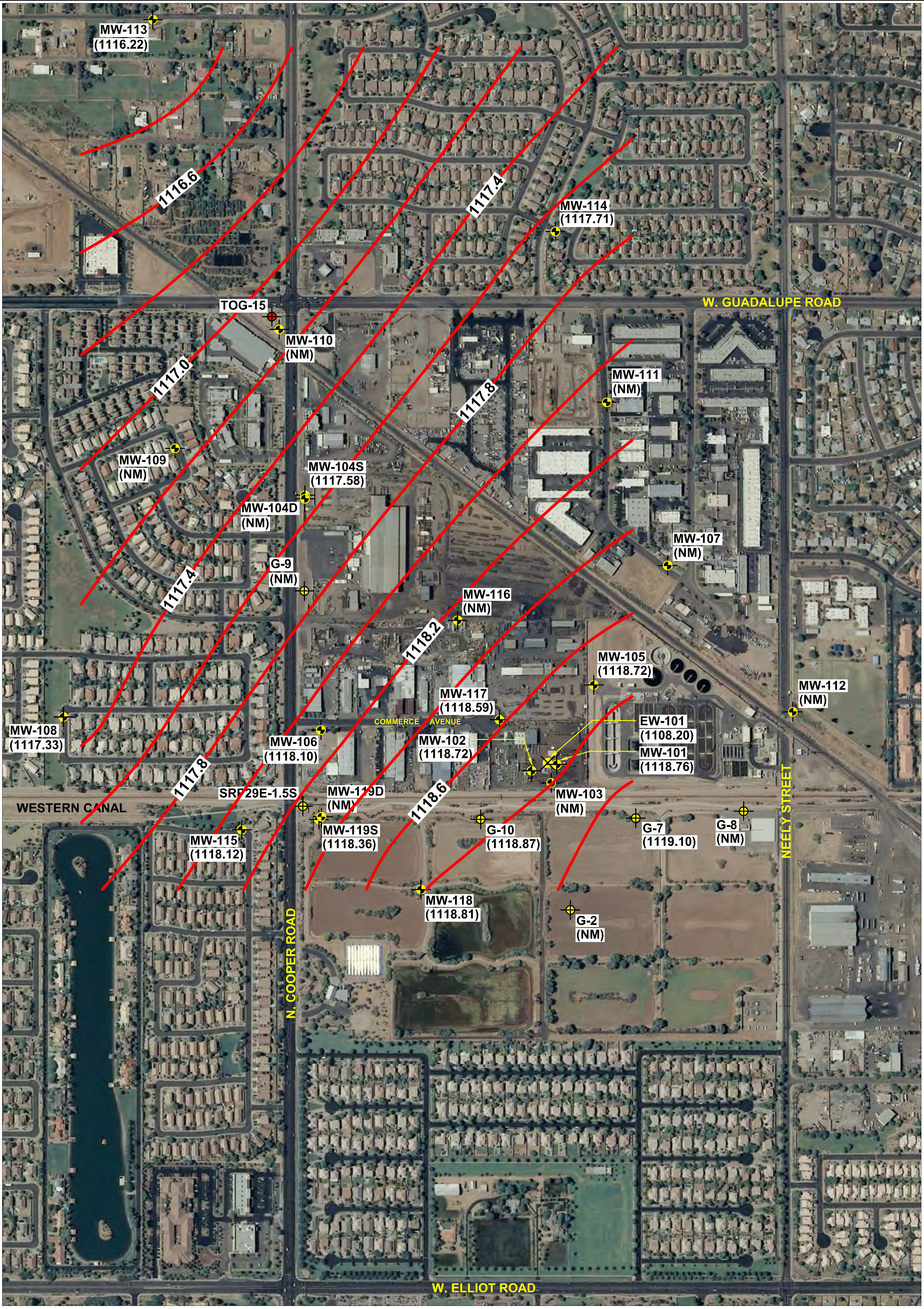
0 500 1,000
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken November 29, 2013.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
NOVEMBER 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	12/31/13	JAA	12/31/13	2010002070A	G.35



Legend

●	MW-102 (1118.72)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	G-7	Well With Dedicated Pump (Not Currently Pumping)
●	TOG-15	Well With Dedicated Pump (Currently Pumping)
✕	EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
—		Groundwater Contour (ft amsl)
	(NM)	Not Measured

N

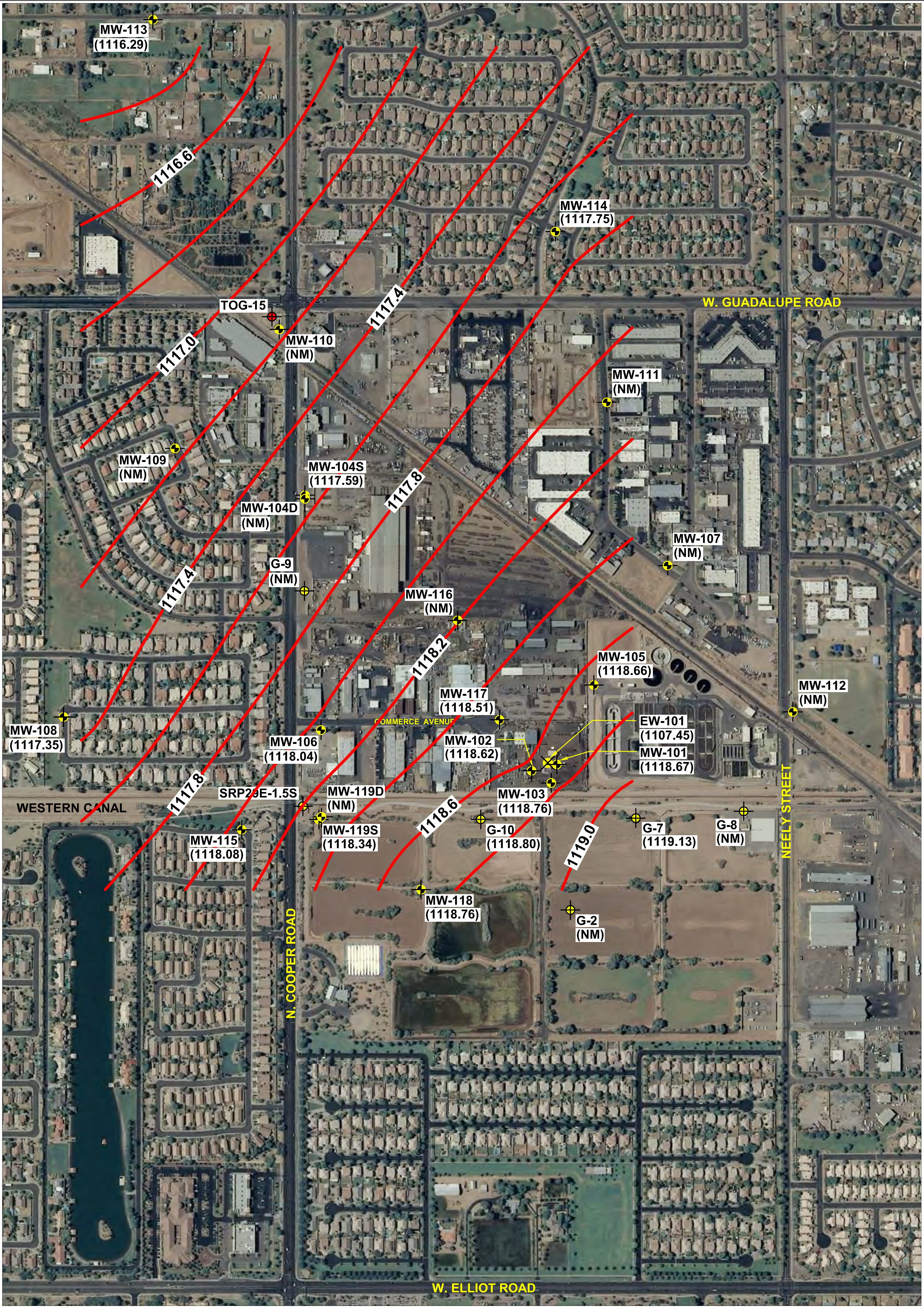
0 500 1,000
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken December 31, 2013.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
DECEMBER 2013
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	1/15/14	JAA	1/15/14	2010002072A	G.36



Legend

MW-102 (1118.62) Monitor Well and Groundwater Elevation (ft amsl)

G-7 Well With Dedicated Pump (Not Currently Pumping)

TOG-15 Well With Dedicated Pump (Currently Pumping)

EW-101 Extraction Well
(EW-101 Well Pump Operating at Time of Measurement)

Groundwater Contour (ft amsl)

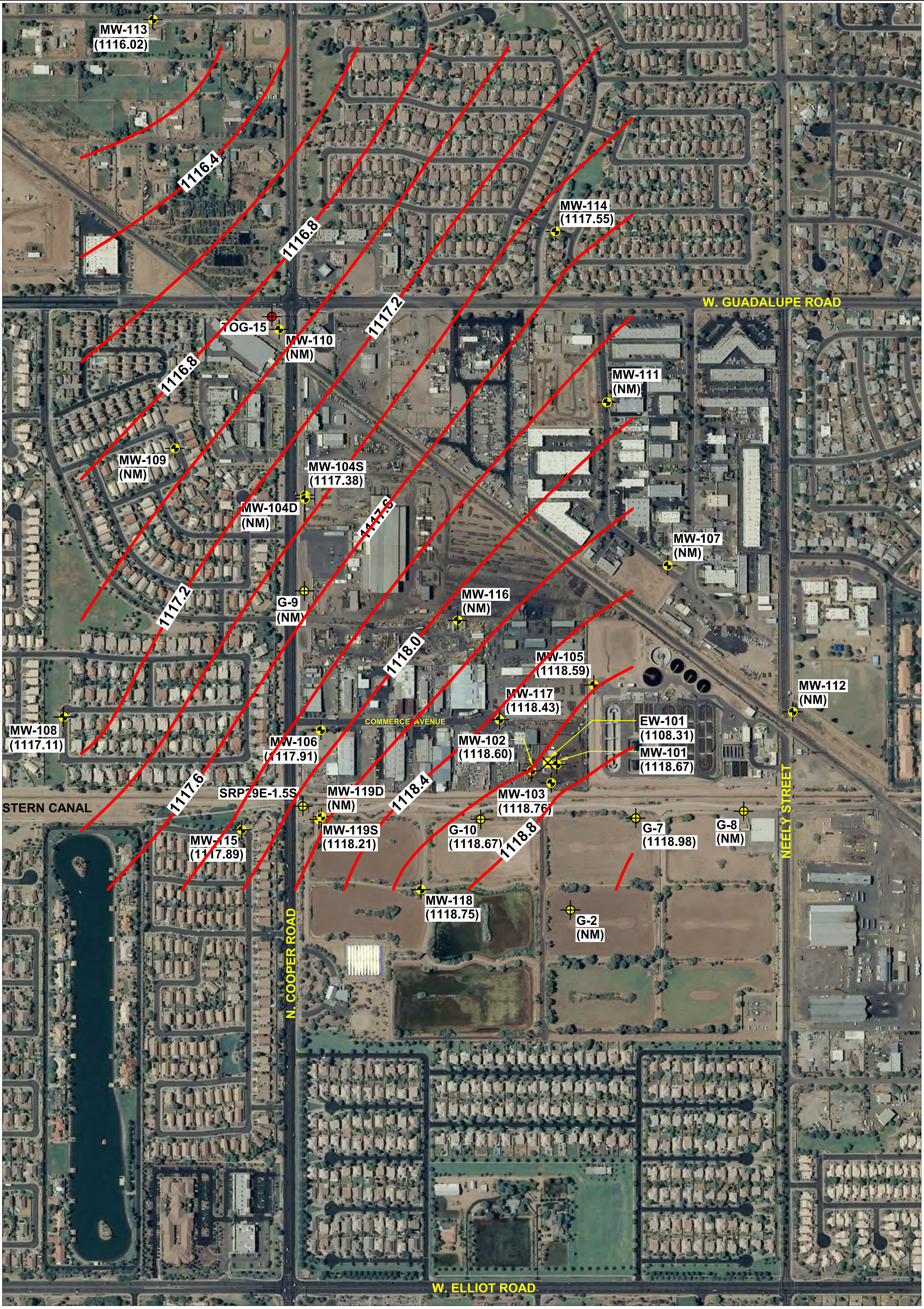
(NM) Not Measured

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken January 29 and 30, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
JANUARY 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	2/28/14	JAA	2/28/14	2010002073A	G.37



Legend

- MW-102 (1118.60) — Monitor Well and Groundwater Elevation (ft amsl)
- G-7 — Well With Dedicated Pump (Not Currently Pumping)
- TOG-15 — Well With Dedicated Pump (Currently Pumping)
- EW-101 — Extraction Well
  (EW-101 Well Pump Operating at Time of Measurement)
- Groundwater Contour (ft amsl)
- (NM) — Not Measured

N

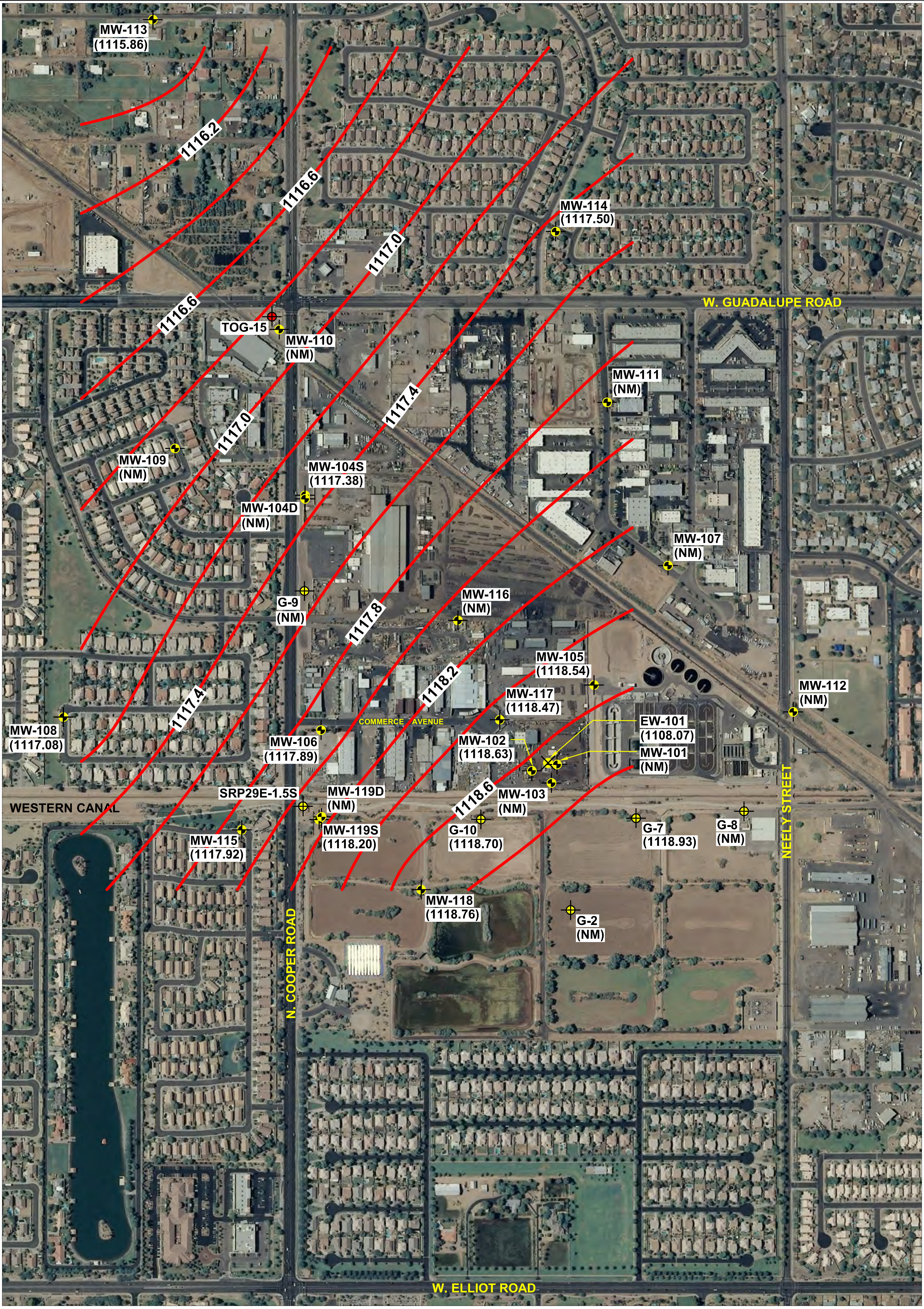
0 500 1,000
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken February 24, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
FEBRUARY 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	3/7/14	JAA	3/7/14	2010002081A	G.38



Legend

MW-102 (1118.63)	Monitor Well and Groundwater Elevation (ft amsl)
G-7	Well With Dedicated Pump (Not Currently Pumping)
TOG-15	Well With Dedicated Pump (Currently Pumping)
EW-101	Extraction Well (EW-101 Well Pump Operating at Time of Measurement)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

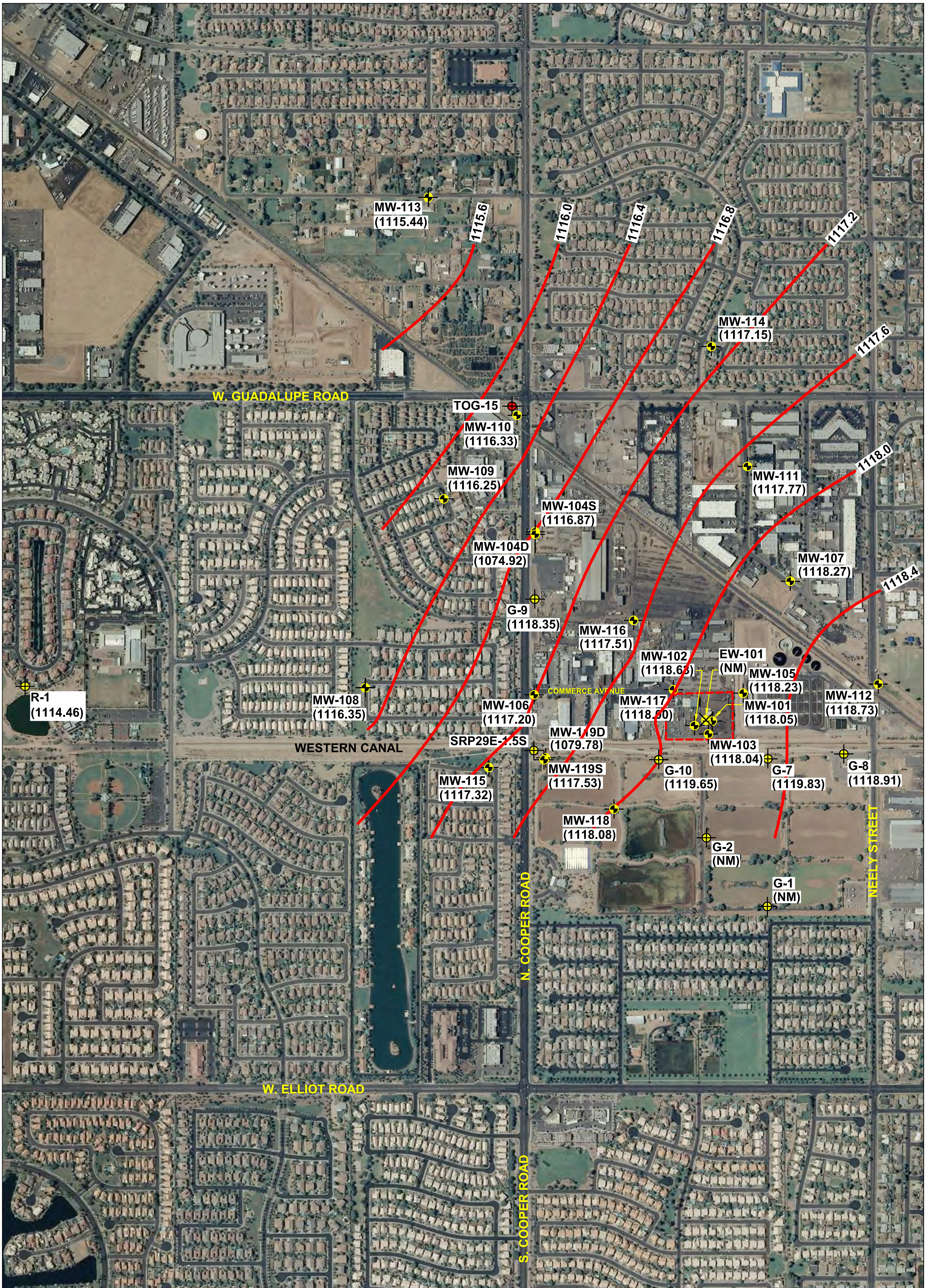
0 500 1,000
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken March 26, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
MARCH 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	4/4/14	JAA	4/4/14	2010002085A	G.39



Legend

MW-101 (1118.05)	Monitor Well and Groundwater Elevation (ft amsl)
	Well With Dedicated Pump (Not Currently Pumping)
	Extraction Well (Well Pump Operating at Time of Measurement)
	Well With Dedicated Pump (Currently Pumping)
	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

0 700 1,400

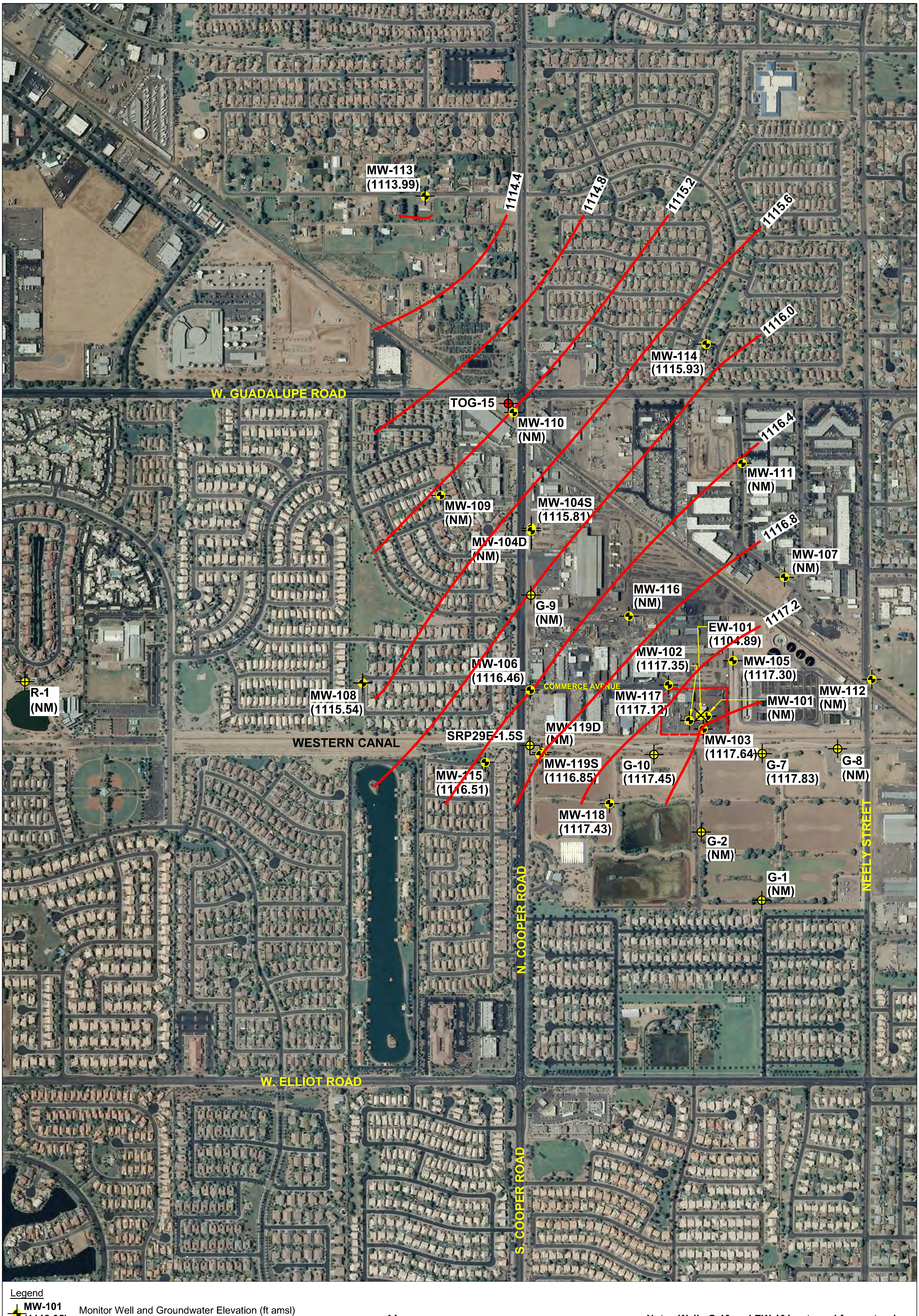
SCALE IN FEET

Note: Wells G-7, G-8, G-9, G-10, R-1, EW-101, MW-102, MW-104D and MW-119D not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken between April 7, 2014 and April 15, 2014

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
APRIL 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	4/30/14	JAA	4/30/14	2010002086A	G.40



Legend

MW-101 (1118.05)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Operating at Time of Measurement)
●	Well With Dedicated Pump (Currently Pumping)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

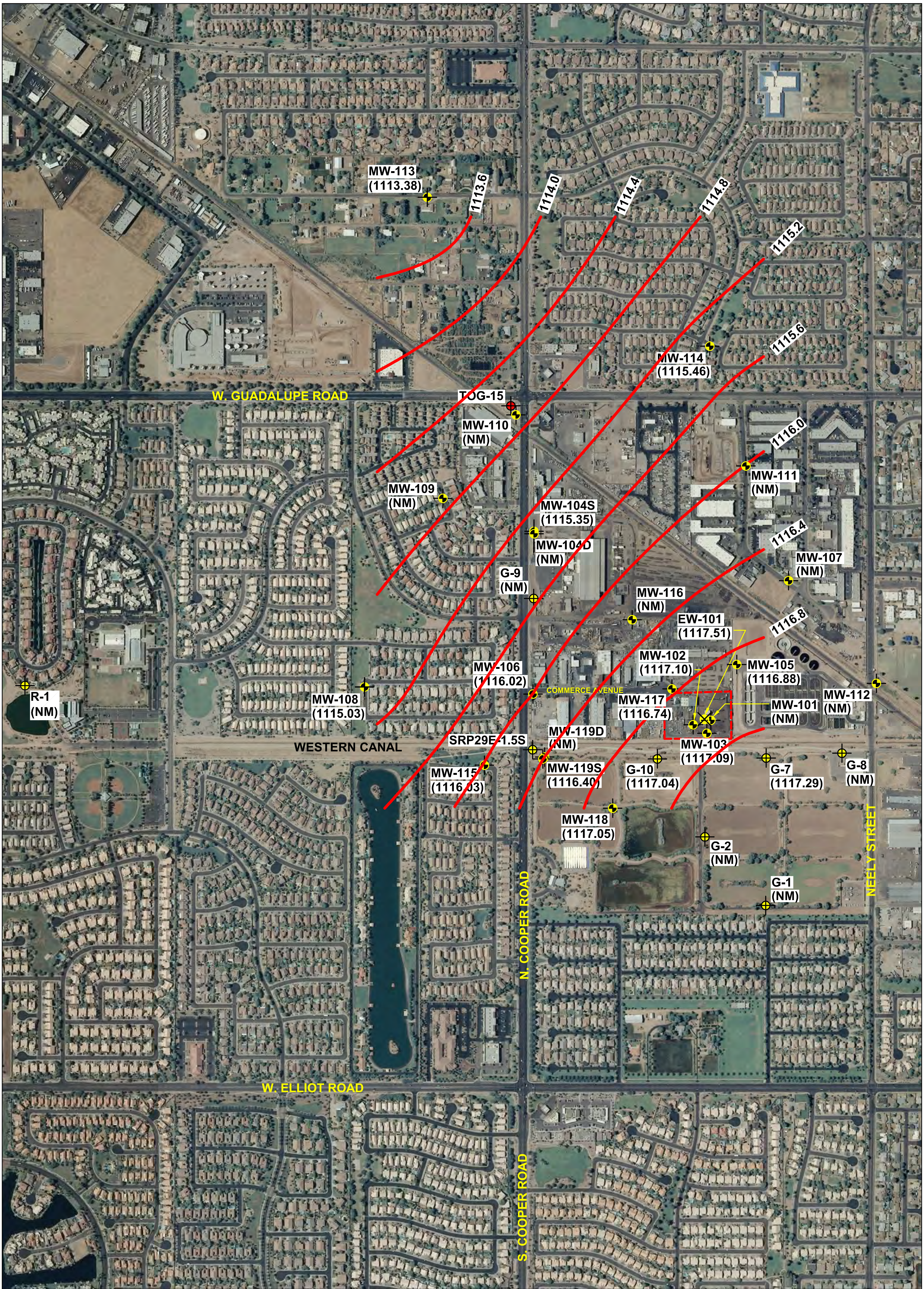
0 700 1,400
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken May 30, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
MAY 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	6/30/14	JAA	6/30/14	2010002089A	G.41



Legend

MW-101 (1118.05)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Not Operating at Time of Measurement)
⊕	Well With Dedicated Pump (Currently Pumping)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

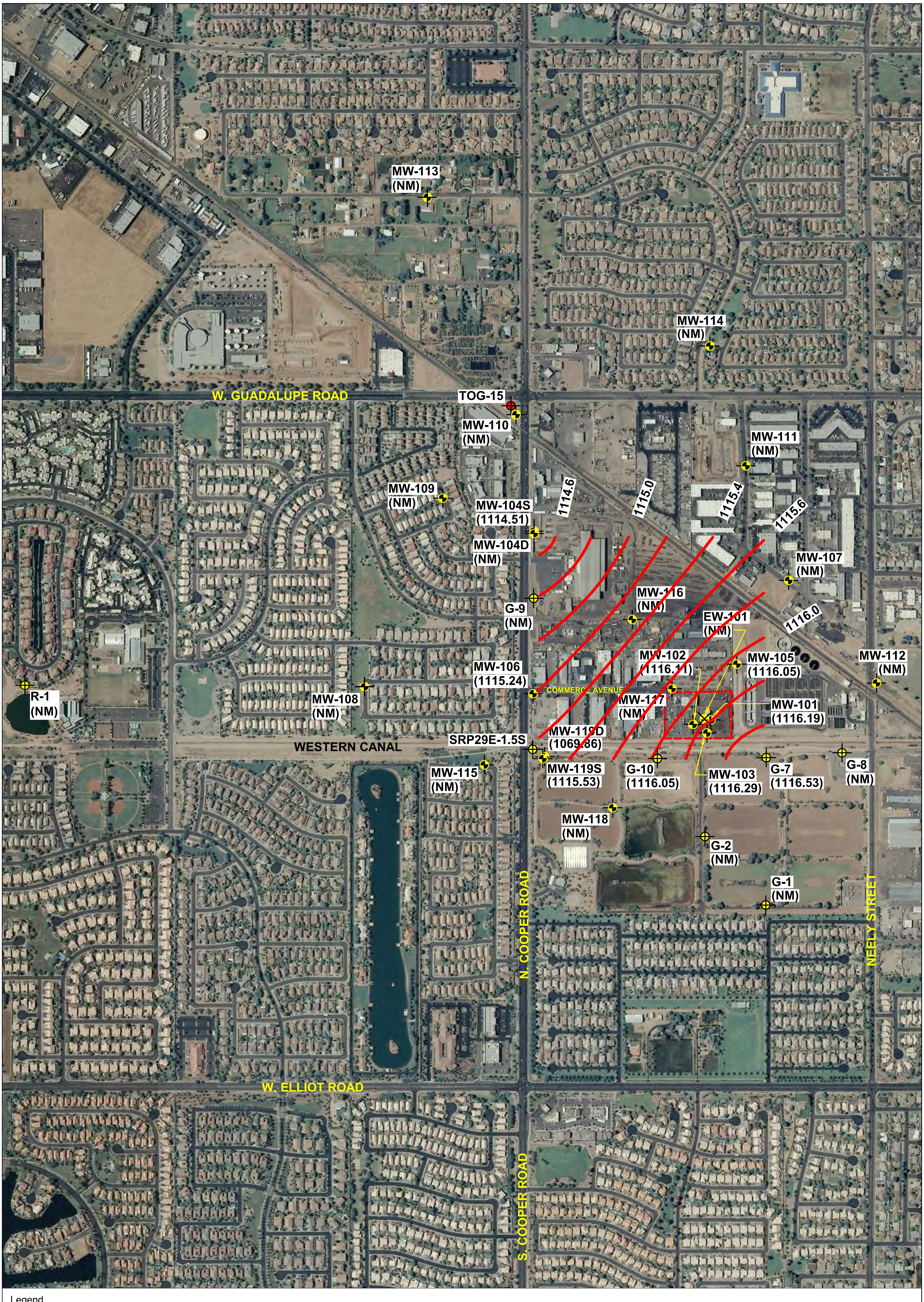
0 700 1,400
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken June 25, 2014.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
JUNE 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	7/07/14	JAA	7/07/14	2010002090A	G.42



Legend

MW-101 (1116.19)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Operating at Time of Measurement)
●	Well With Dedicated Pump (Currently Pumping)
▬	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

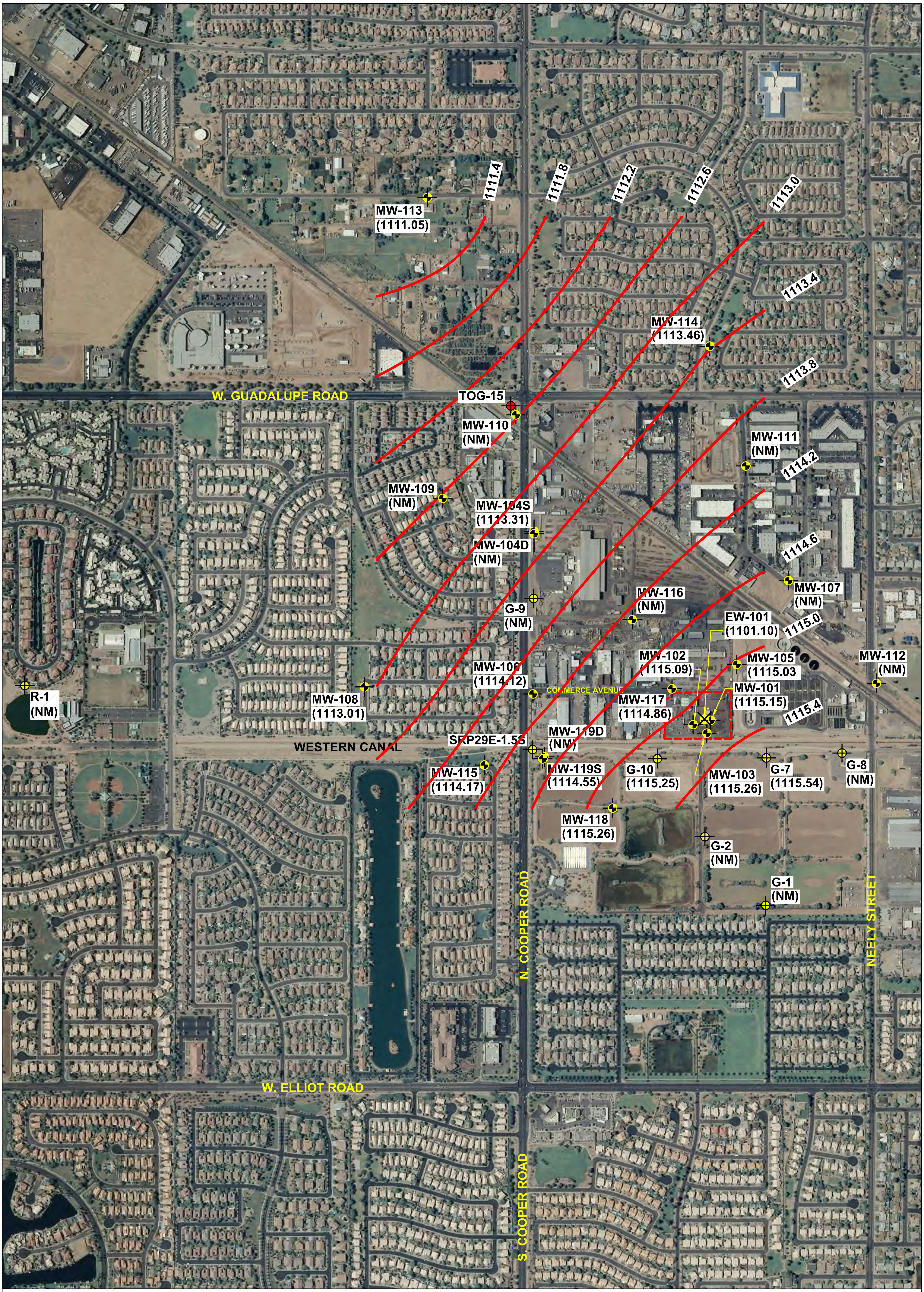
0 700 1,400
SCALE IN FEET

Note: Wells G-10 and MW-119D not used for contouring.
Contour Interval: 0.2 Feet
Well measurements taken between
July 15, 2014 and July 17, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
JULY 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	8/1/14	JAA	8/1/14	2010002091A	G.43



Legend

MW-101 (1115.15)	Monitor Well and Groundwater Elevation (ft amsl)
⊕	Well With Dedicated Pump (Not Currently Pumping)
✕	Extraction Well (Well Pump Operating at Time of Measurement)
●	Well With Dedicated Pump (Currently Pumping)
—	Groundwater Contour (ft amsl)
(NM)	Not Measured

N

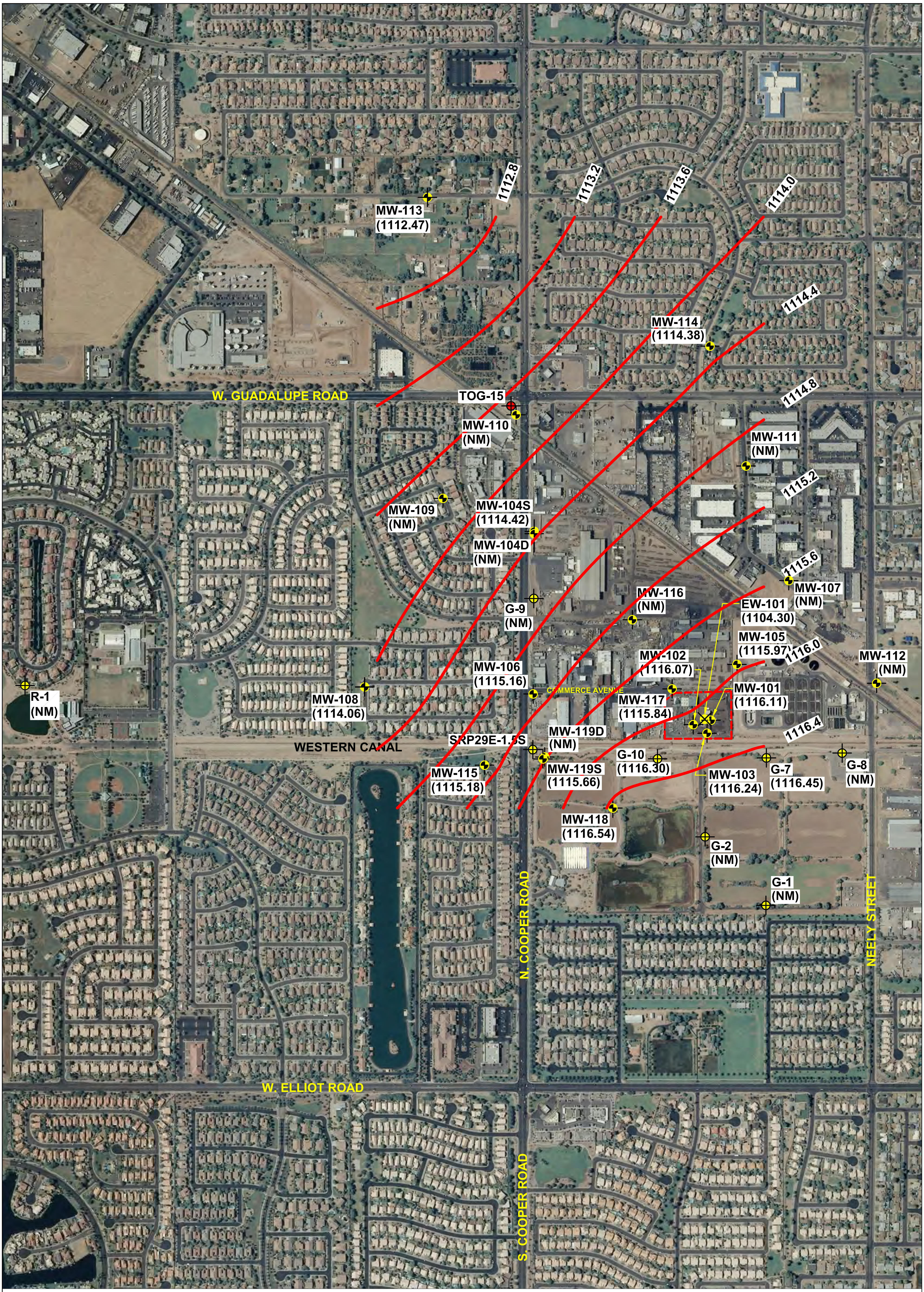
0 700 1,400
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken August 26, 2014.

HYDRO
GEO
CHEM, INC.

GROUNDWATER ELEVATIONS
AUGUST 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	9/30/14	JAA	9/30/14	2010002093A	G.44



Legend

MW-101 (1116.11) Monitor Well and Groundwater Elevation (ft amsl)

⊕ Well With Dedicated Pump (Not Currently Pumping)

✕ Extraction Well (Well Pump Operating at Time of Measurement)

● Well With Dedicated Pump (Currently Pumping)

— Groundwater Contour (ft amsl)

(NM) Not Measured

N

0 700 1,400

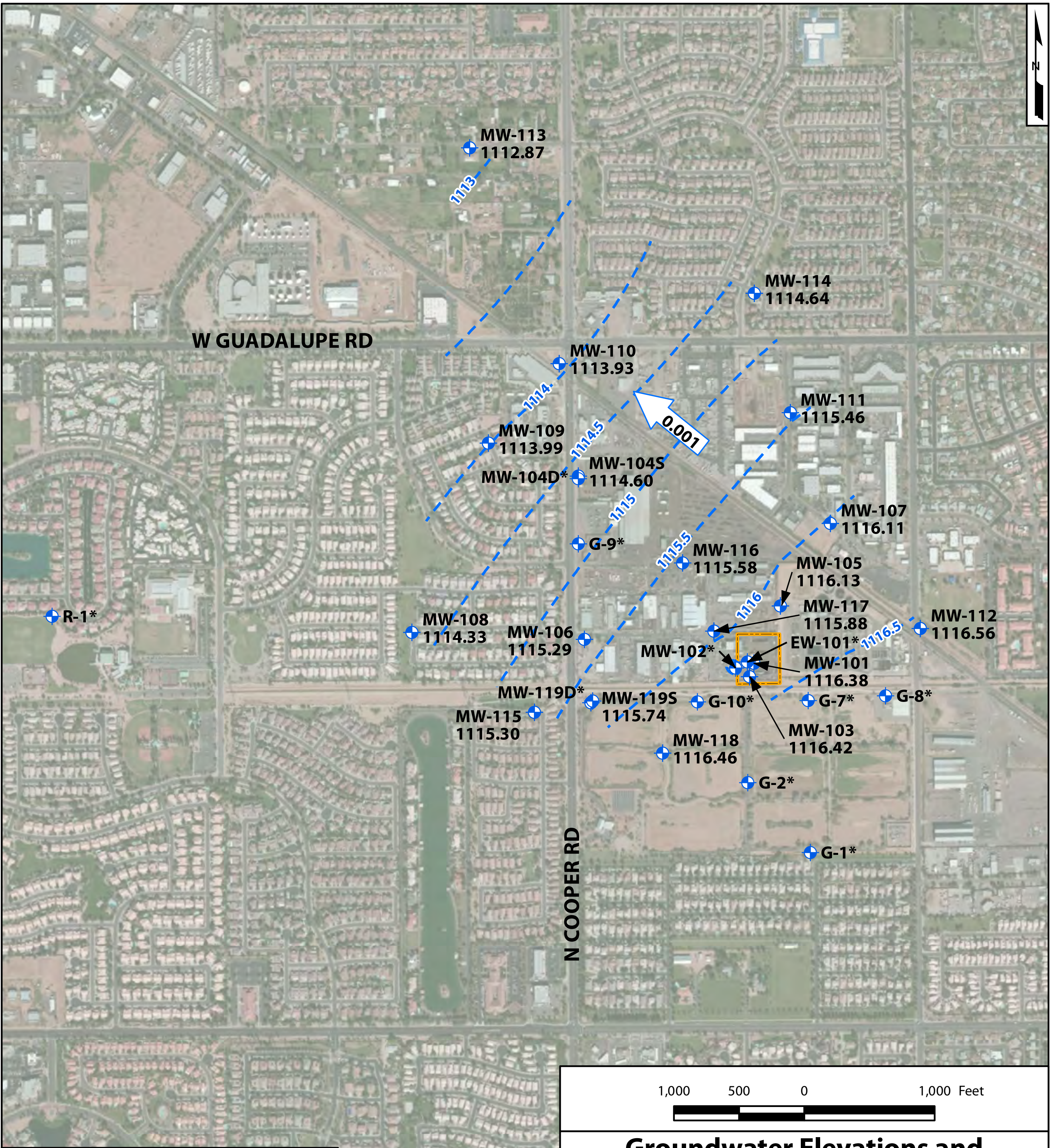
SCALE IN FEET

Note: Wells G-10 and EW-101 not used for contouring.
Contour Interval: 0.4 Feet
Well measurements taken September 26, 2014.

HYDRO GEO CHEM, INC.

GROUNDWATER ELEVATIONS
SEPTEMBER 2014
COOPER AND COMMERCE WQARF SITE

Approved	Date	Author	Date	File Name	Figure
FJS	9/30/14	JAA	9/30/14	2010002094A	



Legend

⌖ Monitor Well

- - - Groundwater Elevation Contours (feet above mean sea level)

▭ Site Boundary

Note: * not used for contouring purposes

November 2010 ESRI World Imagery

Groundwater Elevations and Flow Direction - Fourth Quarter 2014

Cooper and Commerce WQARF Site
Phoenix, AZ

Geosyntec
consultants

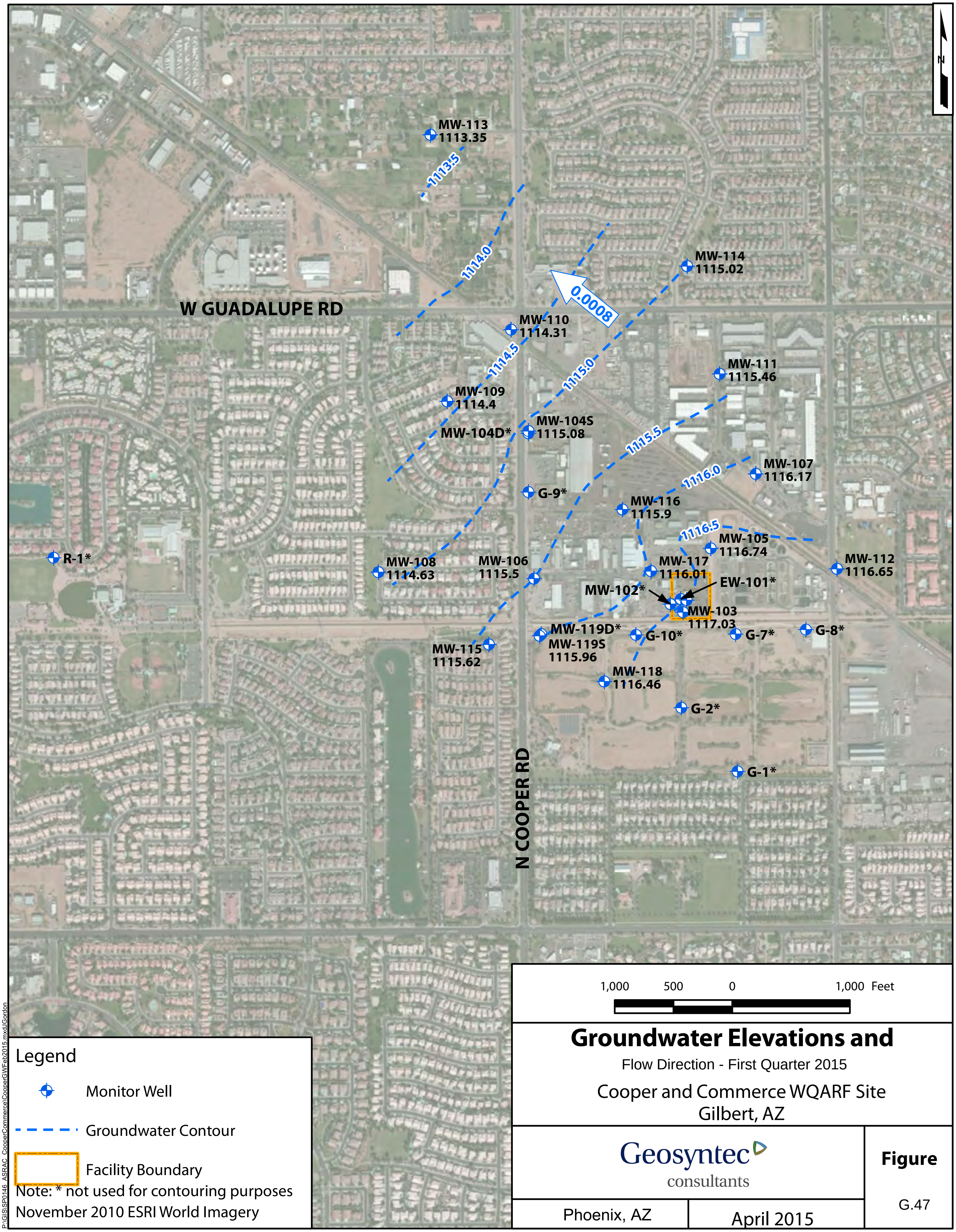
Figure

Phoenix, AZ

February 2015

G.46

P:\GIS\SP0146_ASRAC_CooperCommerce\CooperGW.mxdJGordon



Legend

Monitor Well

Groundwater Contour

Facility Boundary

Note: * not used for contouring purposes
November 2010 ESRI World Imagery

Groundwater Elevations and

Flow Direction - First Quarter 2015

Cooper and Commerce WQARF Site
Gilbert, AZ

Geosyntec
consultants

Phoenix, AZ

April 2015

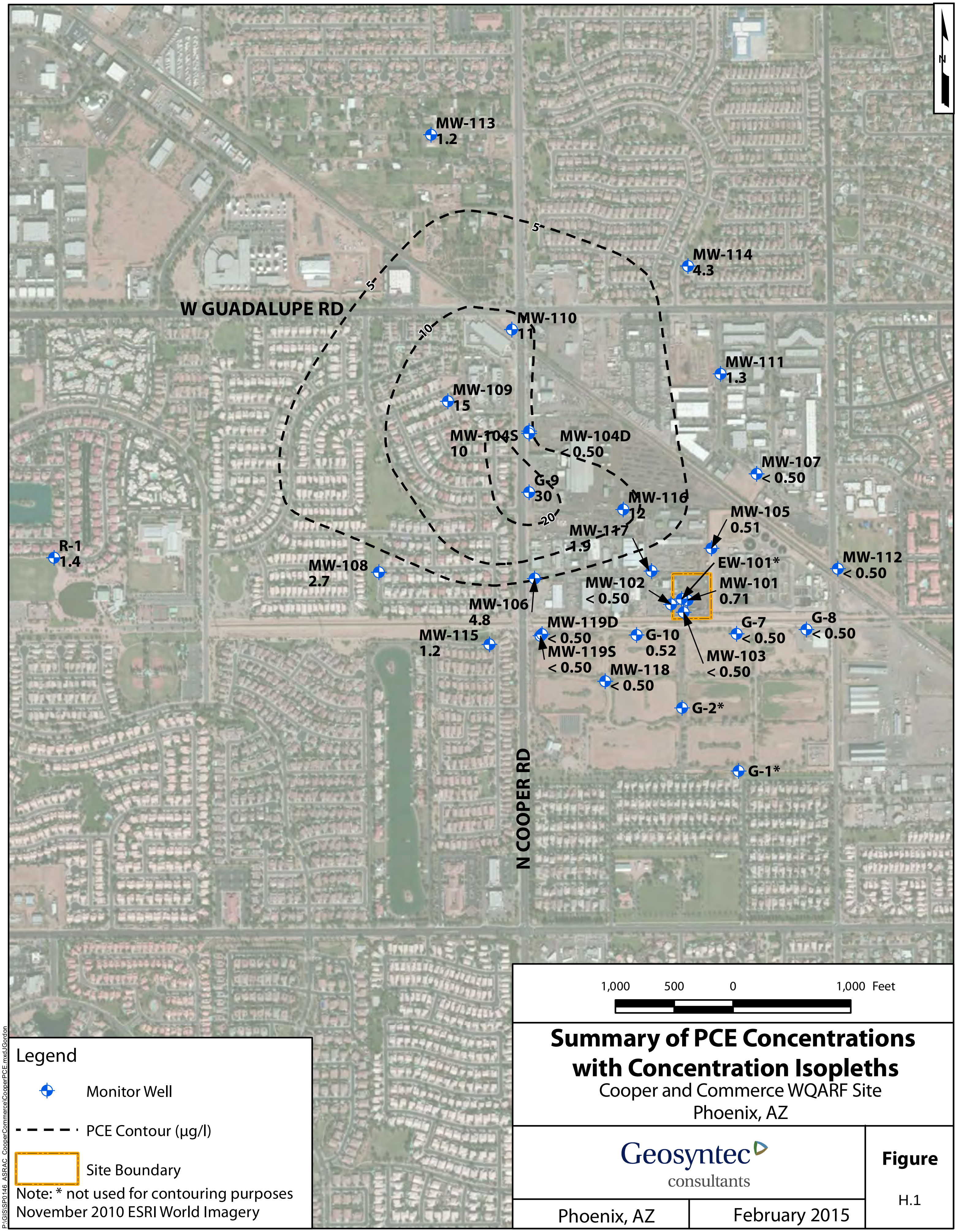
Figure

G.47

P:\GIS\SP0146 ASRAC CooperCommerce\CooperGWFeb2015.mxdJGordon

APPENDIX H

PCE CONCENTRATION CONTOUR MAPS



Legend

- Monitor Well
- PCE Contour (µg/l)
- Site Boundary

Note: * not used for contouring purposes
November 2010 ESRI World Imagery

Summary of PCE Concentrations with Concentration Isopleths

Cooper and Commerce WQARF Site
Phoenix, AZ

Geosyntec consultants

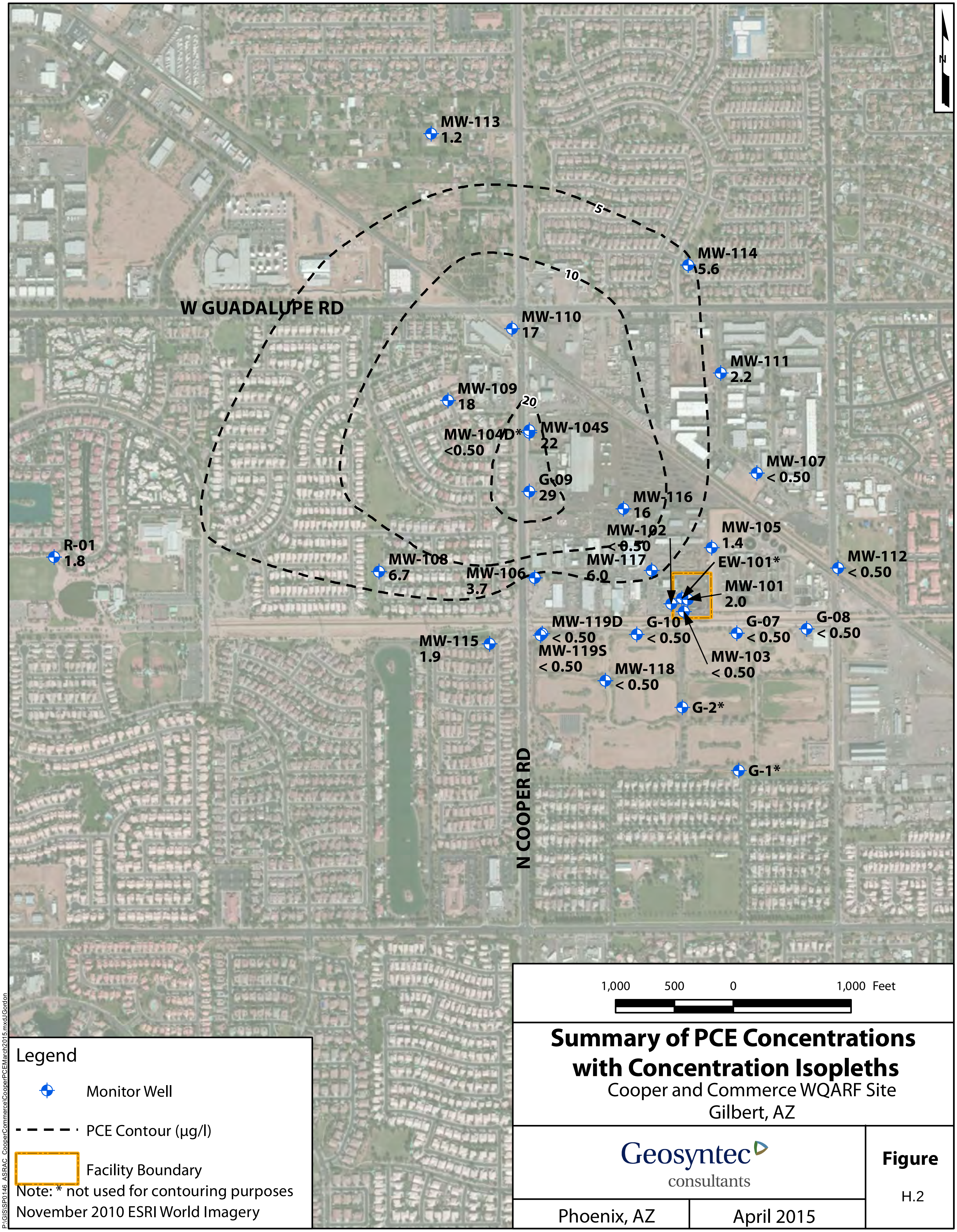
Phoenix, AZ

February 2015

Figure

H.1

P:\GIS\SP0146_ASRAC_CooperCommerce\CooperPCE.mxd\JGordon



Note: * not used for contouring purposes
November 2010 ESRI World Imagery

Summary of PCE Concentrations with Concentration Isopleths

Cooper and Commerce WQARF Site
Gilbert, AZ

Geosyntec
consultants

Phoenix, AZ

April 2015

Figure

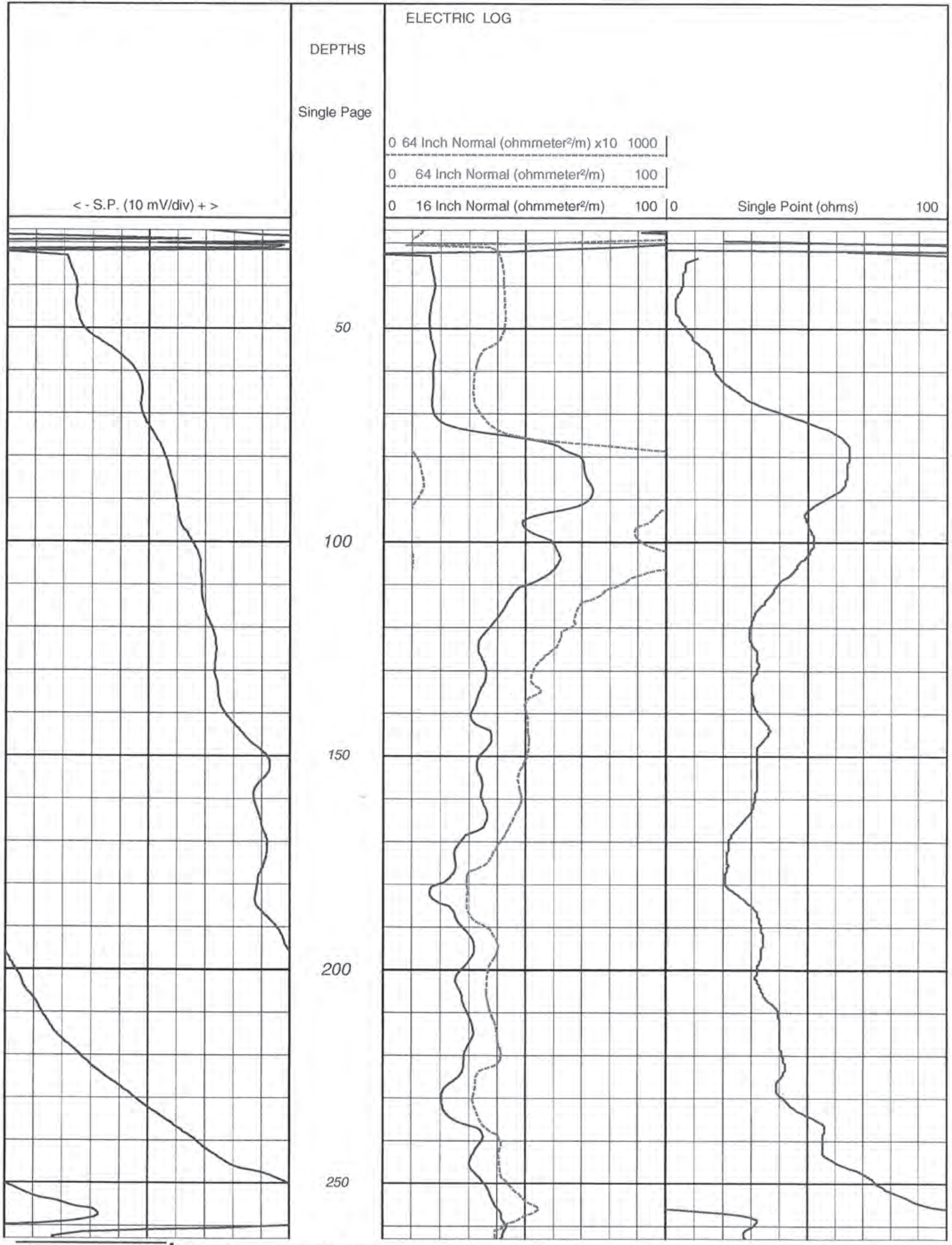
H.2

P:\GIS\SP0146 ASRAC CooperCommerce\CooperPCEMarch2015.mxd JGordon

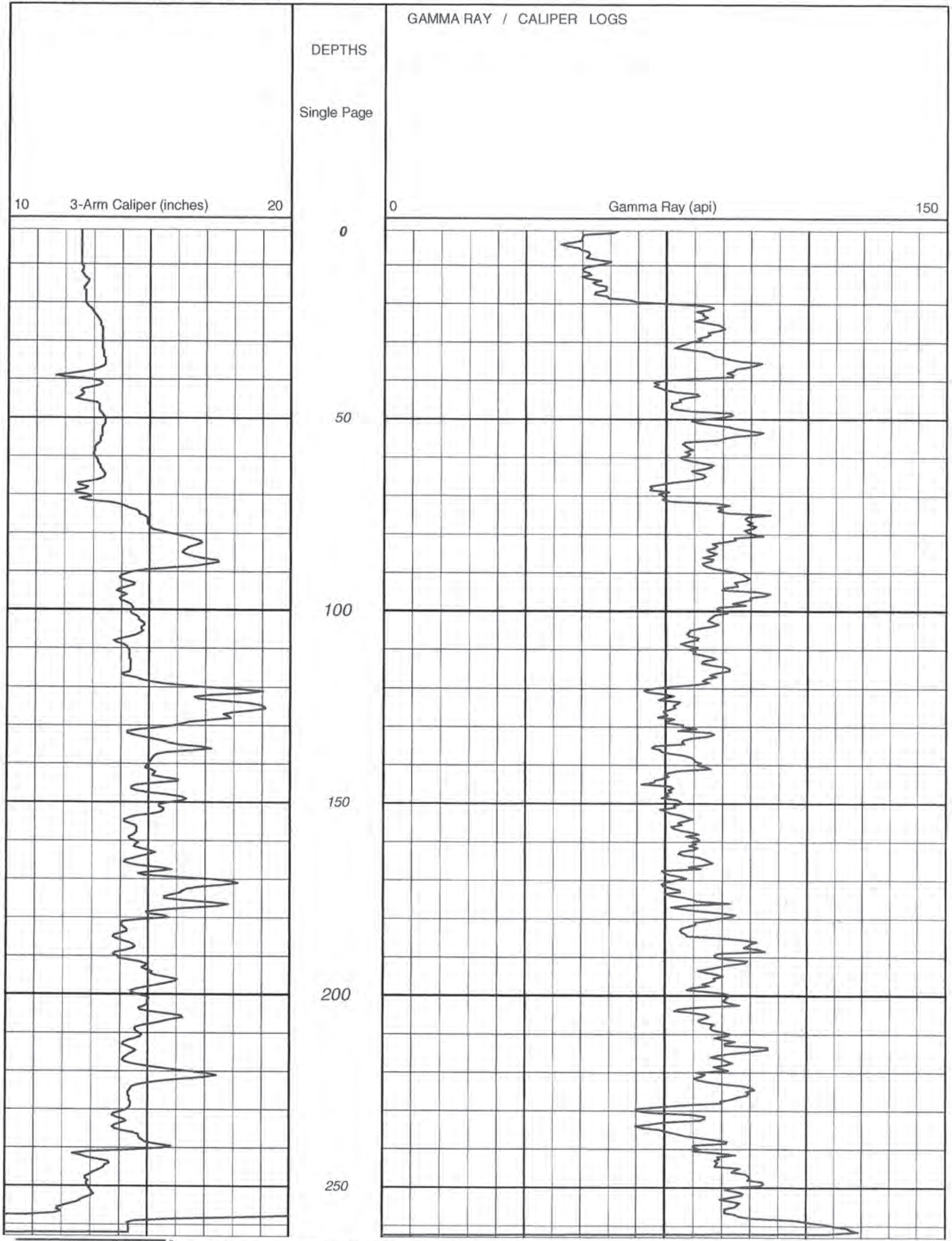
APPENDIX I

BOREHOLE GEOPHYSICAL LOGS

Hydro Geo Chem EW - 101 Mar 31, 2006



Hydro Geo Chem EW-101 Mar.31, 2006



Southwest Geophysical Services, Inc.

COMPANY BE& K TERRANEXT
WELL ID MW-104D
FIELD GILBERT
COUNTY MARICOPA STATE ARIZONA

TYPE OF LOG: E-LOGS-GUARD

LOCATION

SW1/4 of NW 1/4 of NW 1/4

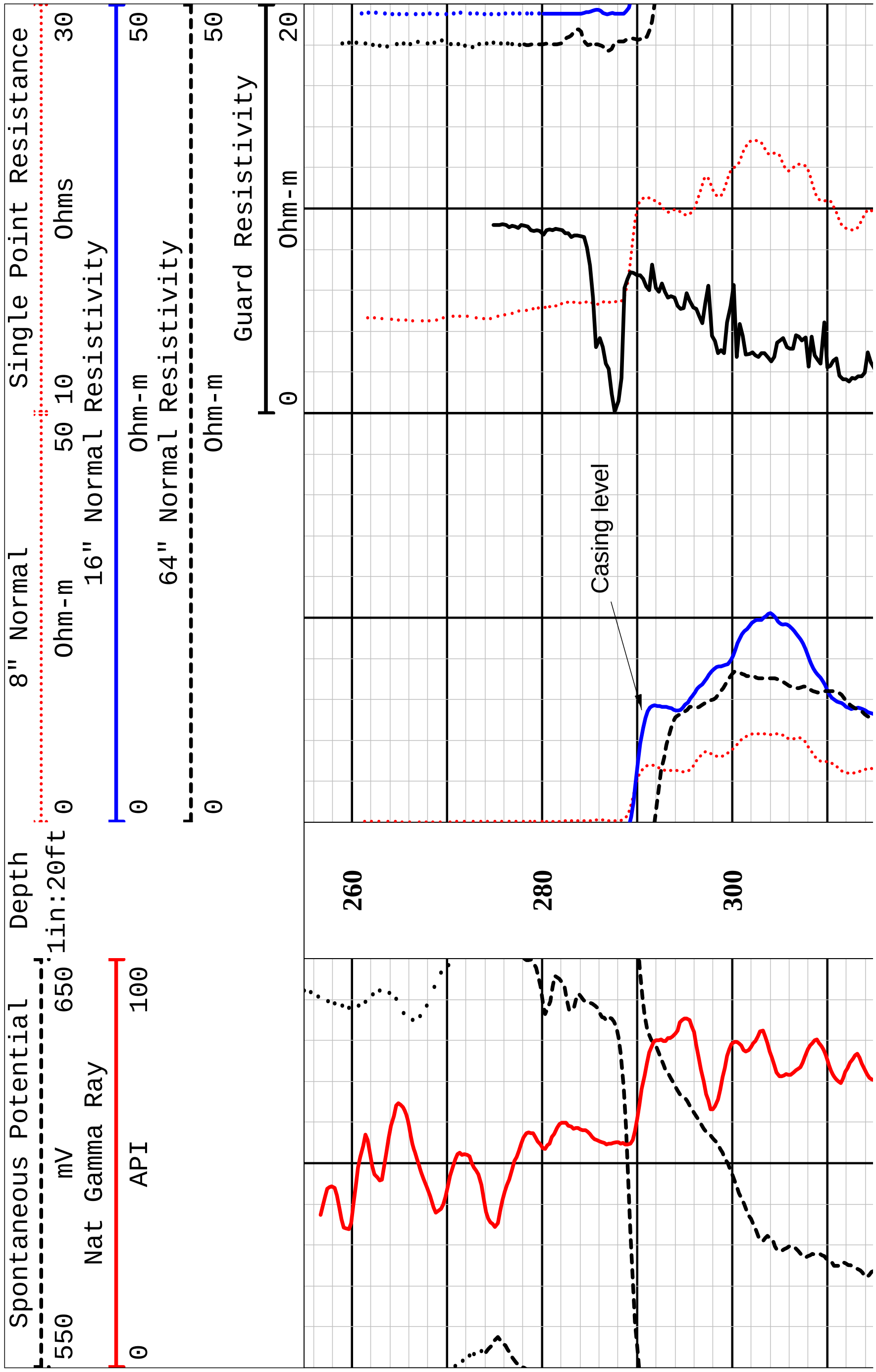
SEC 12 TWP 1S RGE E5

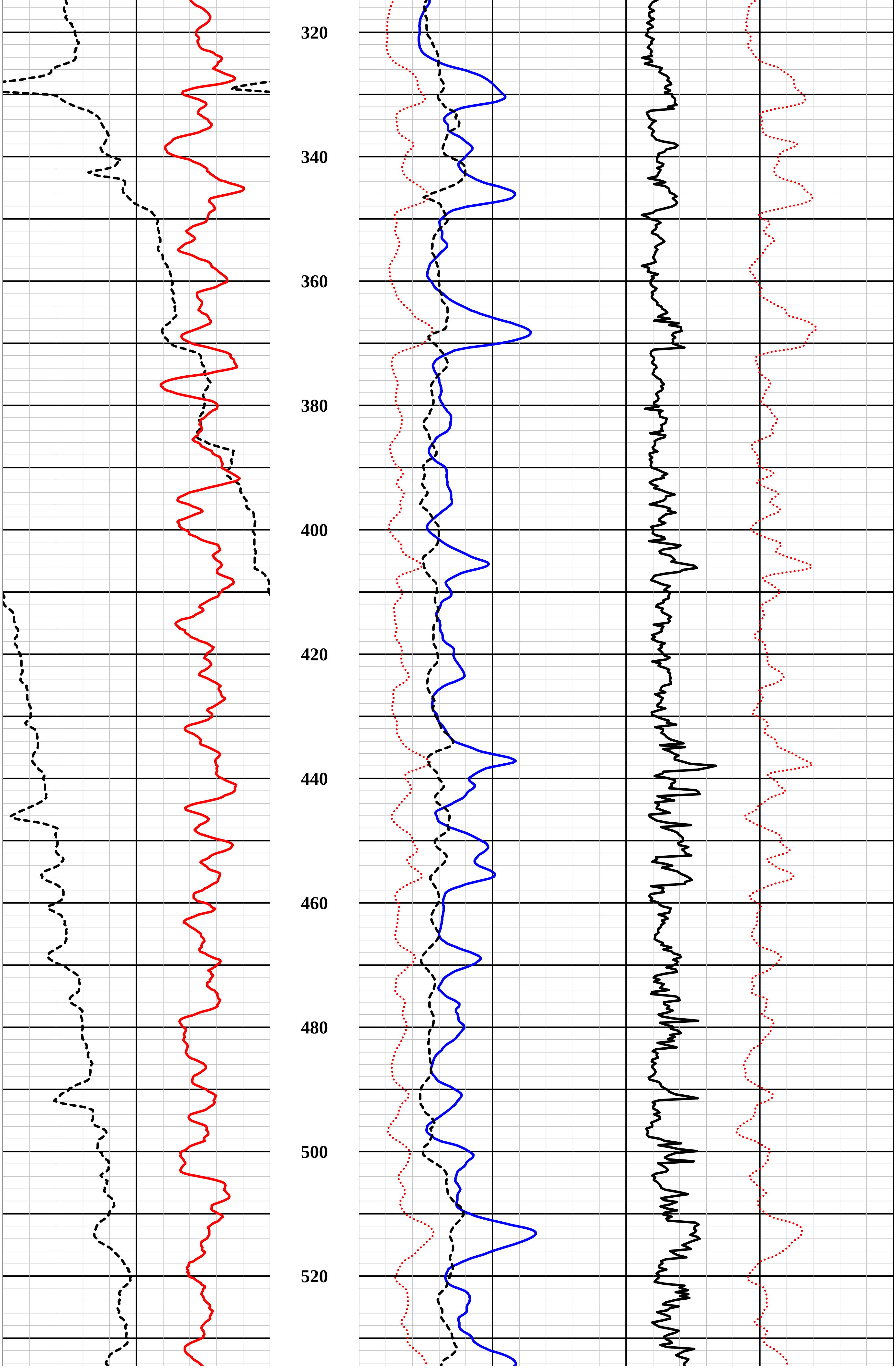
OTHER SERVICES
CALIPER
NAT. GAMMA
NEUTRON

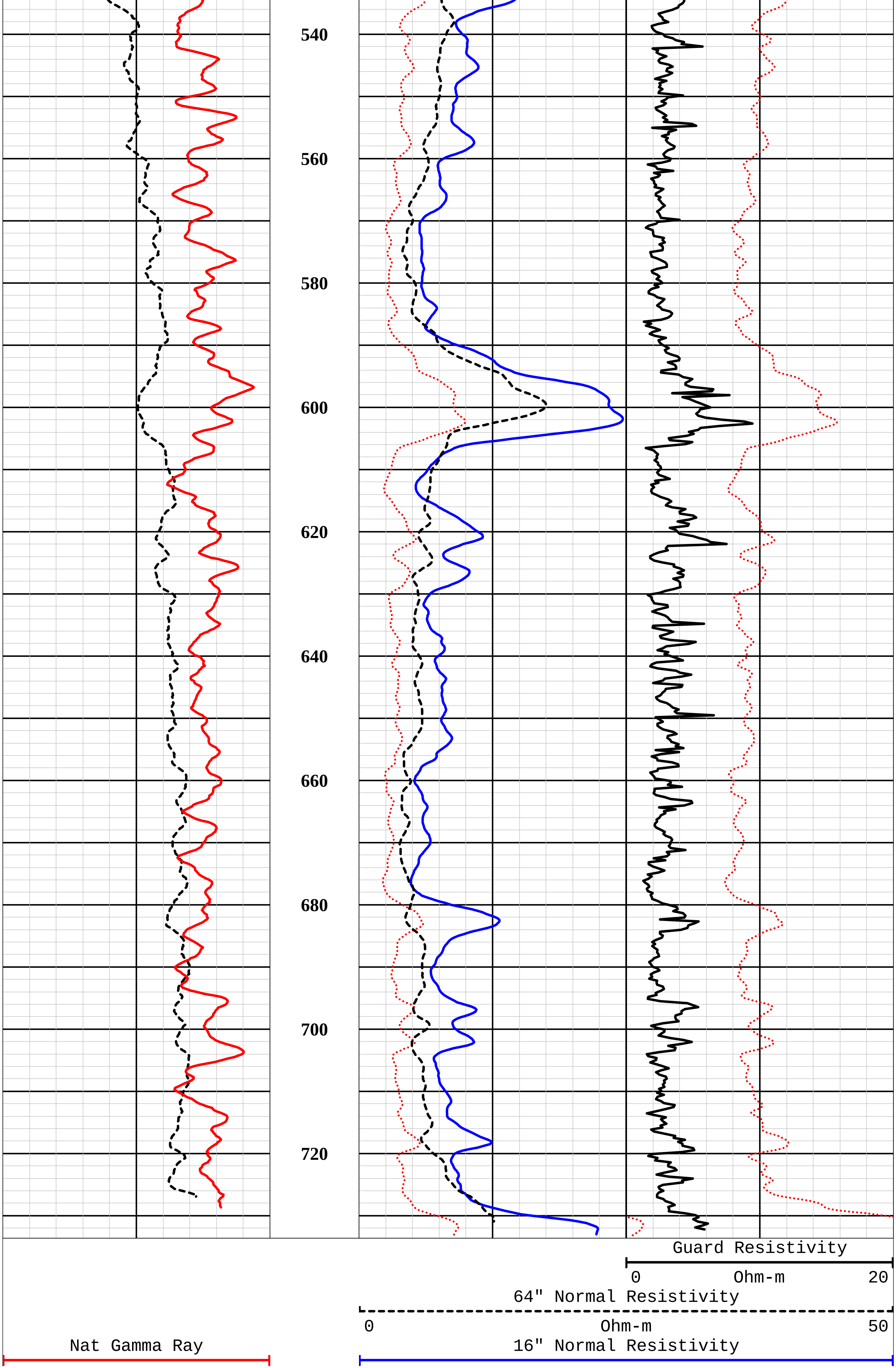
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	TOP OF CASING	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	7-9-03	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	E-LOGS	DENSITY	
DEPTH-DRILLER	750 FT	LEVEL	50 FT
DEPTH-LOGGER	735 FT	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	735 FT		
TOP LOGGED INTERVAL	280 FT		
OPERATING RIG TIME			
RECORDED BY	K. MITCHELL/A. HEDRICK		
WITNESSED BY	BE&K TERR		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	15"	SURFACE	290 FT	10"		SURFACE	290 FT
2	9 7/8"	290 FT	TOTAL DEPTH				




320
340
360
380
400
420
440
460
480
500
520


540
560
580
600
620
640
660
680
700
720
Guard Resistivity
0
Ohm-m
20
64" Normal Resistivity
0
Ohm-m
50
16" Normal Resistivity
Nat Gamma Ray

0 API 100		0 Ohm-m 50	
Spontaneous Potential	Depth	8" Normal	Single Point Resistance
550 mV 650	1in:20ft	0 Ohm-m 50	10 Ohms 30

Southwest Geophysical Services, Inc.

COMPANY BE& K TERRANEXT
WELL ID MW-104D
FIELD GILBERT
COUNTY MARICOPA STATE ARIZONA

TYPE OF LOG: GAMMA-NEUTRON-CAL

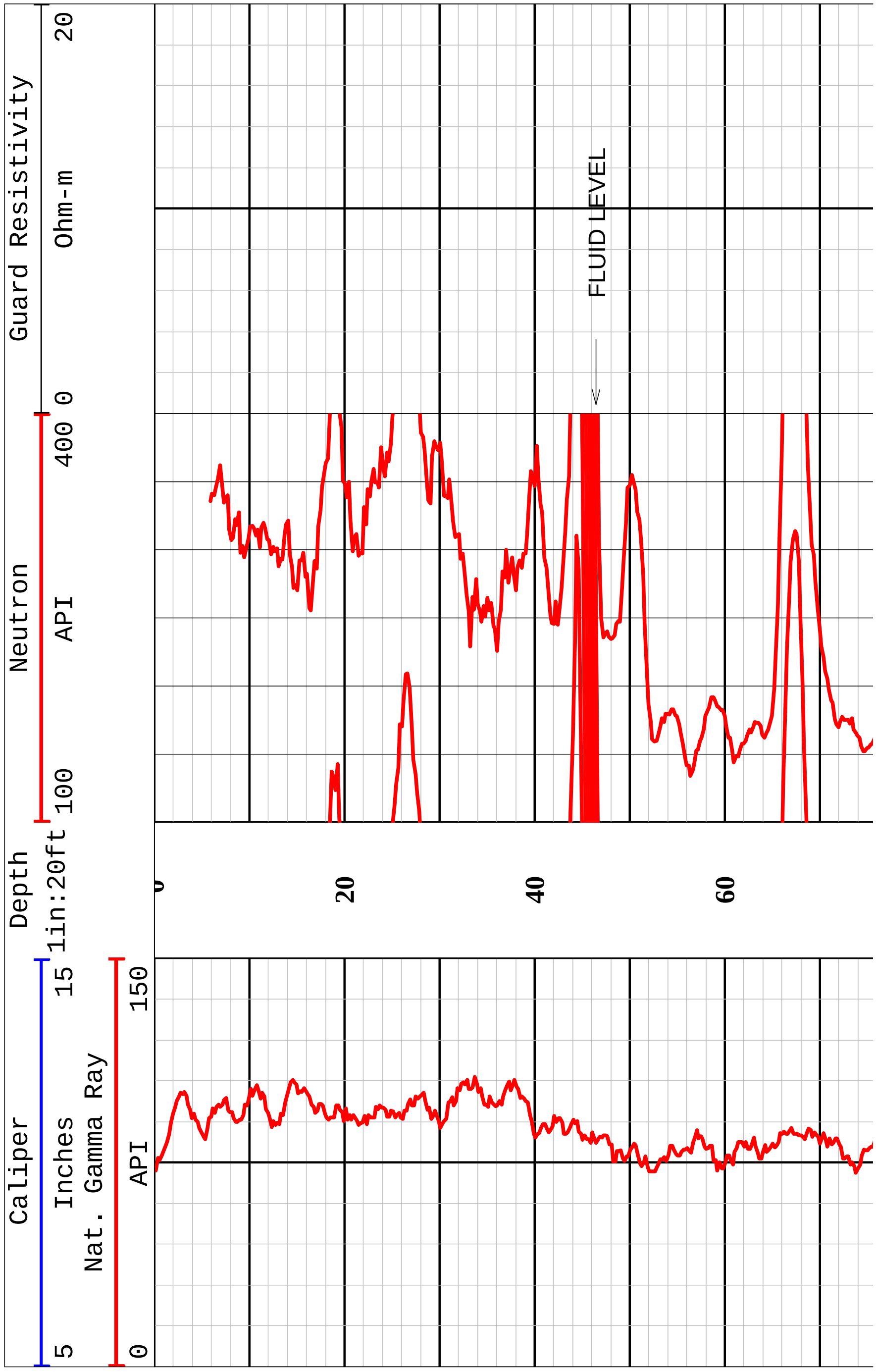
LOCATION
SW1/4 of NW 1/4 of NW 1/4
SEC 12 TWP 1S RGE E5

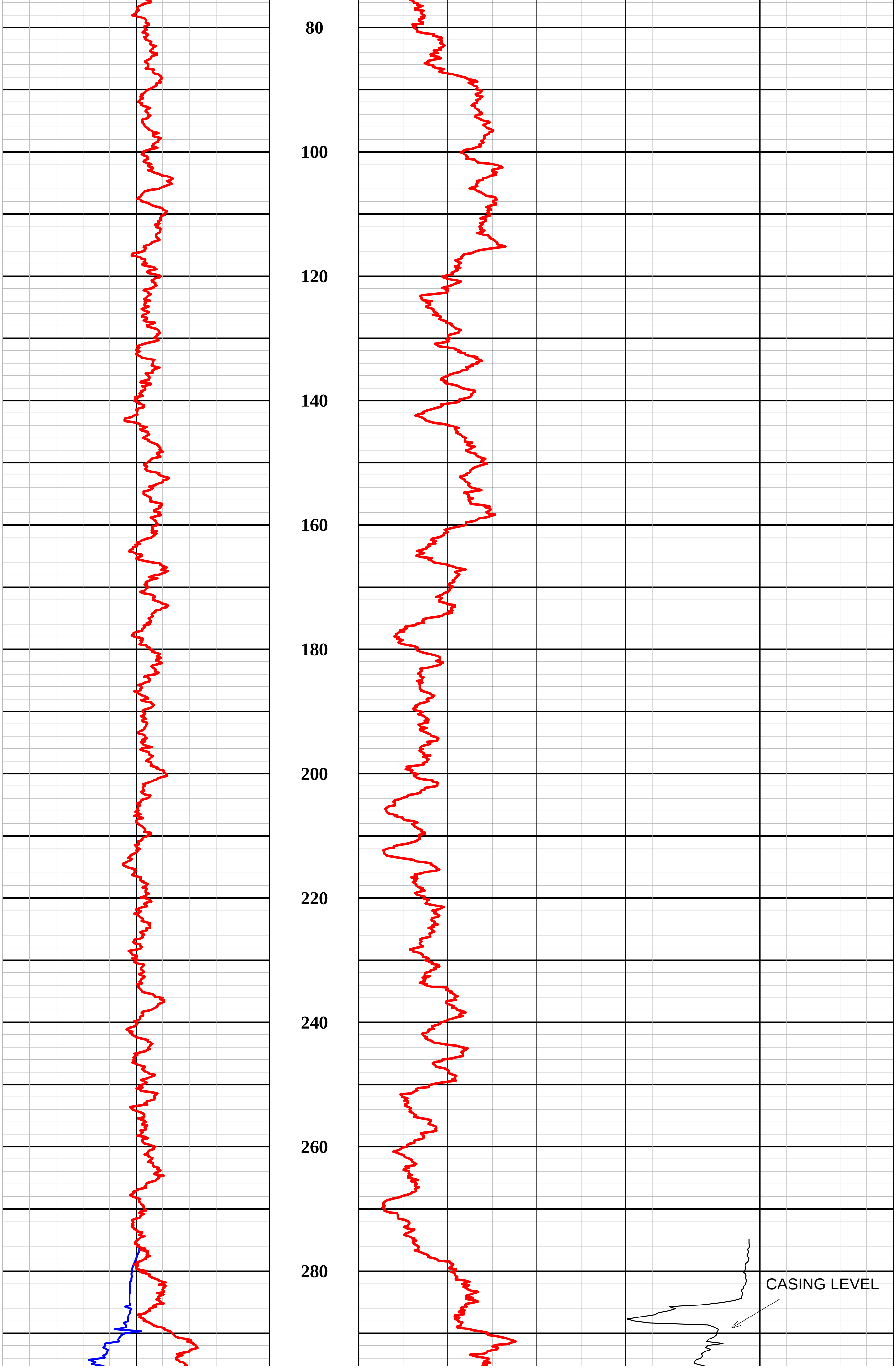
OTHER SERVICES
E-LOGS
GUARD

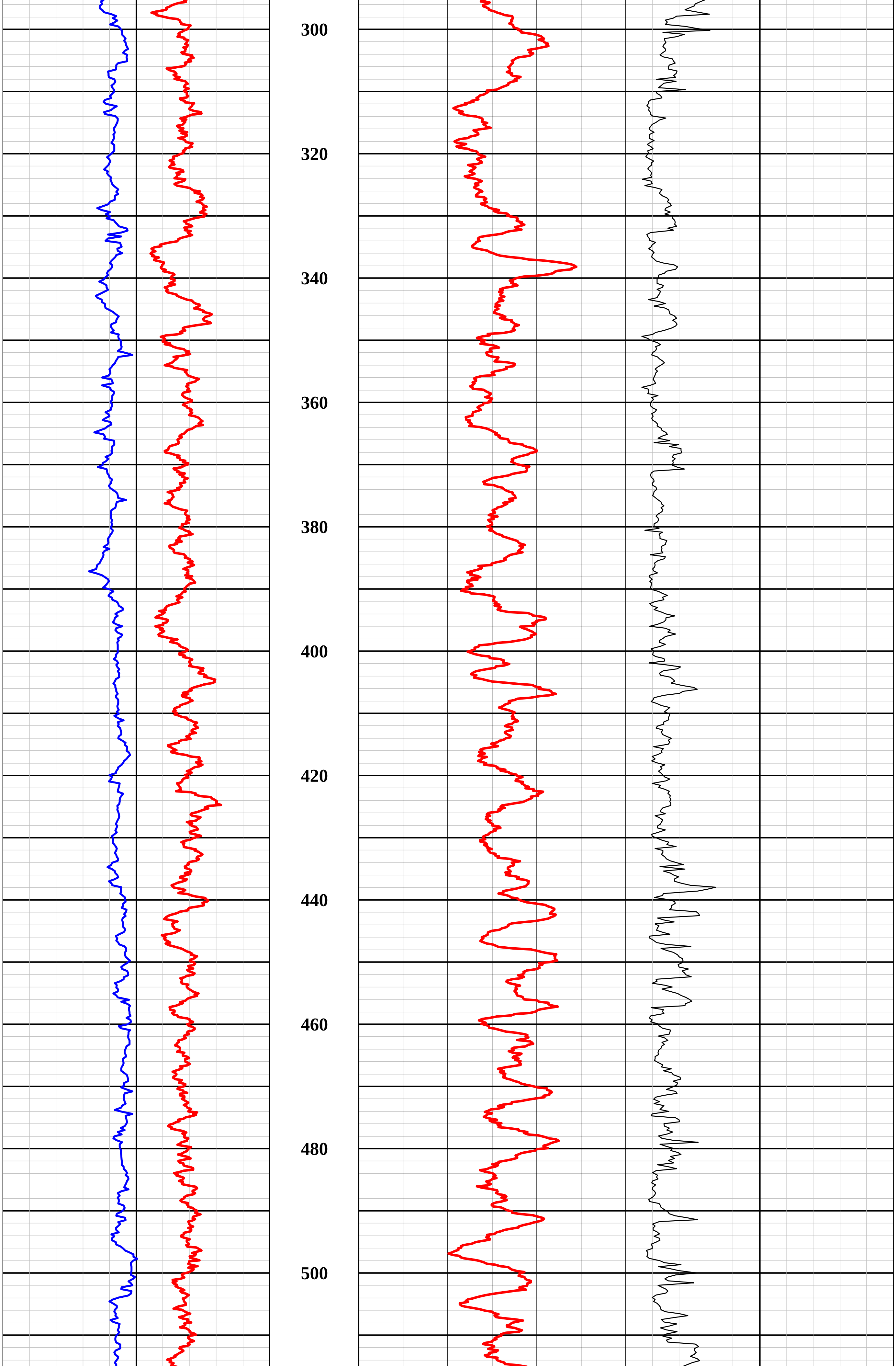
PERMANENT DATUM ELEVATION K.B.
LOG MEAS. FROM TOP OF CASING ABOVE PERM. DATUM D.F.
DRILLING MEAS. FROM G.L.

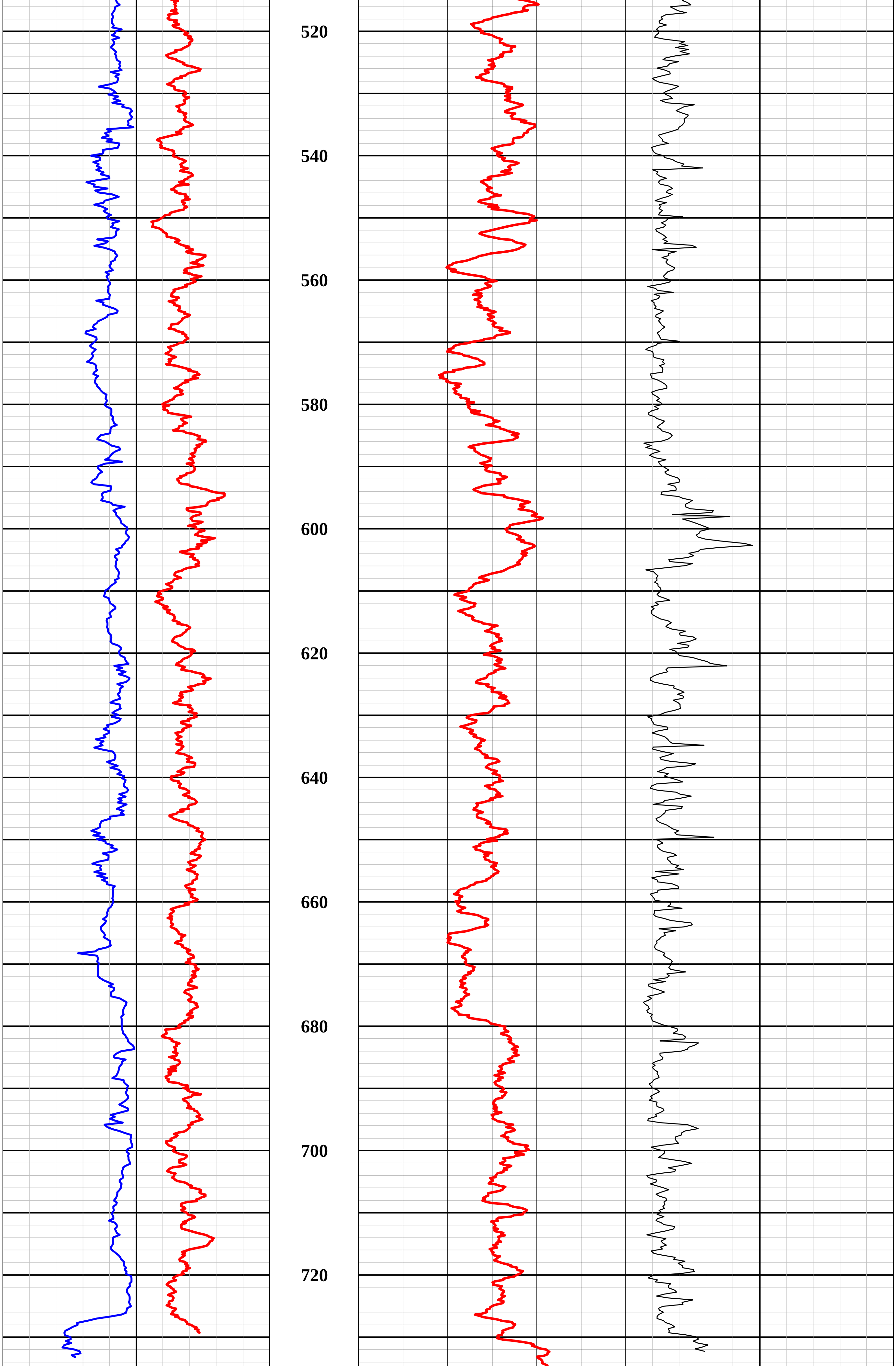
DATE	7-9-03	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1	SALINITY	
TYPE LOG	GAMMA-NEUT-CALIPER	DENSITY	
DEPTH-DRILLER	750 FT	LEVEL	50 FT
DEPTH-LOGGER	735 FT	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	735 FT		
TOP LOGGED INTERVAL	280 FT		
OPERATING RIG TIME			
RECORDED BY	K. MITCHELL/A. HEDRICK		
WITNESSED BY	BE&K TERR		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	15"	SURFACE	290 FT	10"		SURFACE	290 FT
2	9 7/8"	290 FT	TOTAL DEPTH				




80
100
120
140
160
180
200
220
240
260
280
CASING LEVEL


300
320
340
360
380
400
420
440
460
480
500


520
540
560
580
600
620
640
660
680
700
720

Nat. Gamma Ray

0 API 150

Caliper

5 Inches 15

Depth

1in:20ft

Neutron

100 API 400

Guard Resistivity

0 Ohm-m 20

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	HYDROGEOCHEM		
WELL ID	MW-119D		
FIELD	WQARF SITE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: ELOGS-NAT. GAMMA

MORE: NEUTRON-CALIPER

OTHER SERVICES

LOCATION
COOPER RD. & COMMERCE AVE., GILBERT

SEC TWP RGE

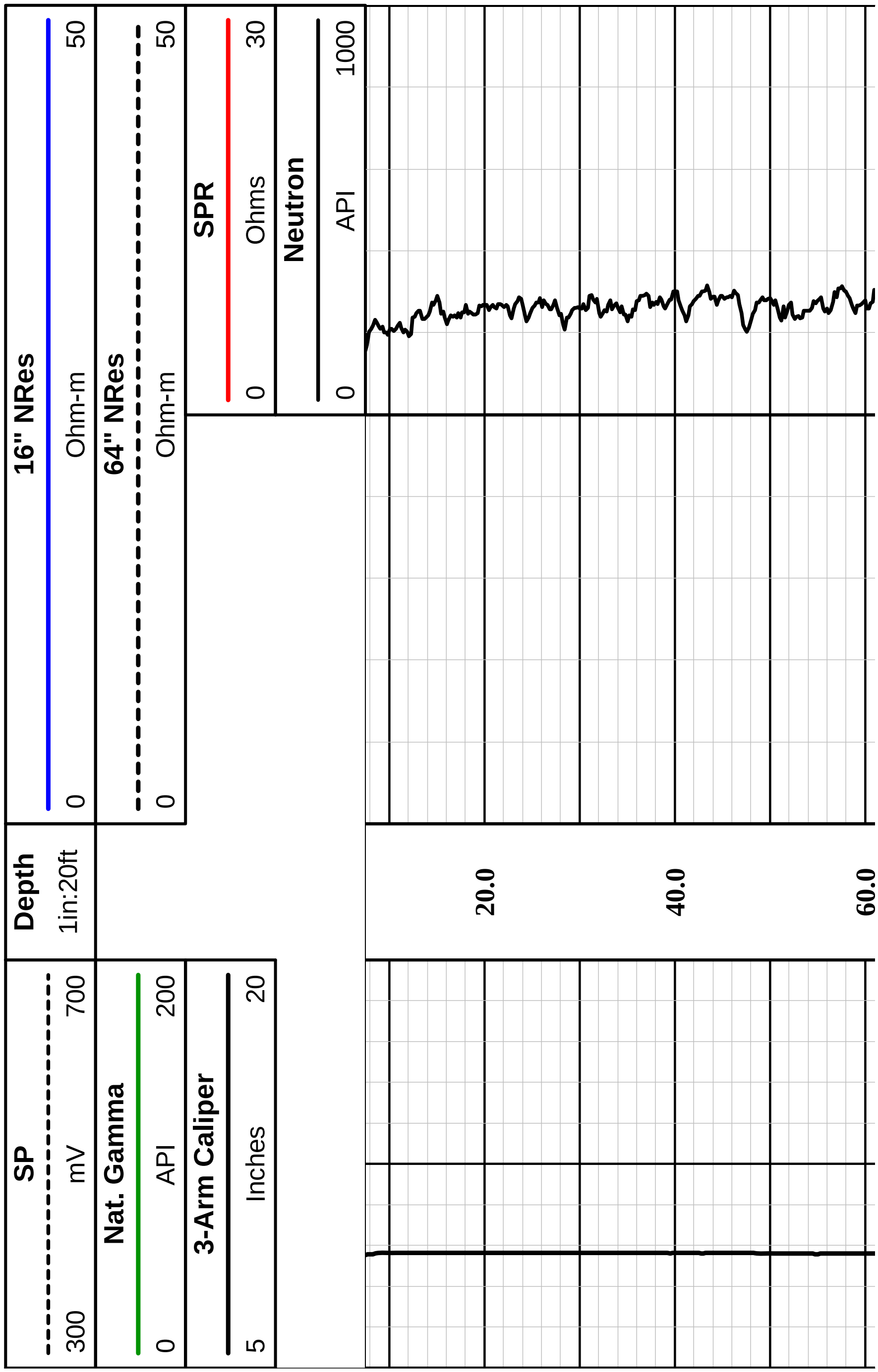
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

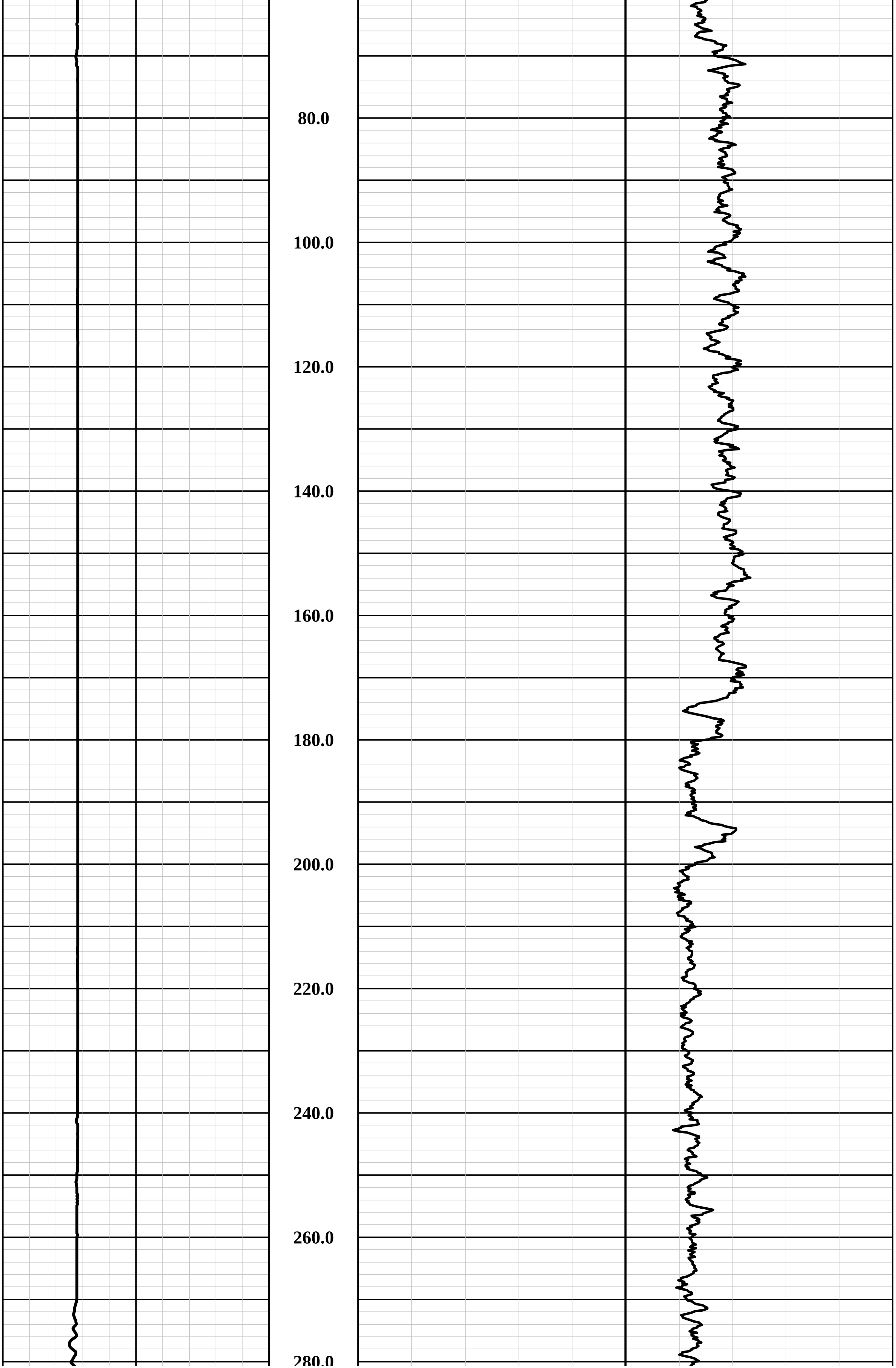
DATE	9-27-13	TYPE FLUID IN HOLE	FRESH MUD
RUN No	1-2-3	SALINITY	N/A
TYPE LOG	ELOGS-GAM-NEUT-CAL	DENSITY	N/A
DEPTH-DRILLER	627 FT	LEVEL	FULL
DEPTH-LOGGER	610 FT	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	610 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	.2 FT
DRILLER / RIG#	NATIONAL	LOGGING TRUCK	TRUCK #400
RECORDED BY / Logging Eng.	E. TURNER	TOOL STRING/SN	SEE COMMENTS
WITNESSED BY	HGC - S. SUTHERLAND	LOG TIME:ON SITE/OFF SITE	1500 / 1745

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	288 FT	10"		SURFACE	288 FT
2	9 7/8"	288 FT	TOTAL DEPTH				

COMMENTS: 40GRP 5514 - G-N 1107 - COMBO

.

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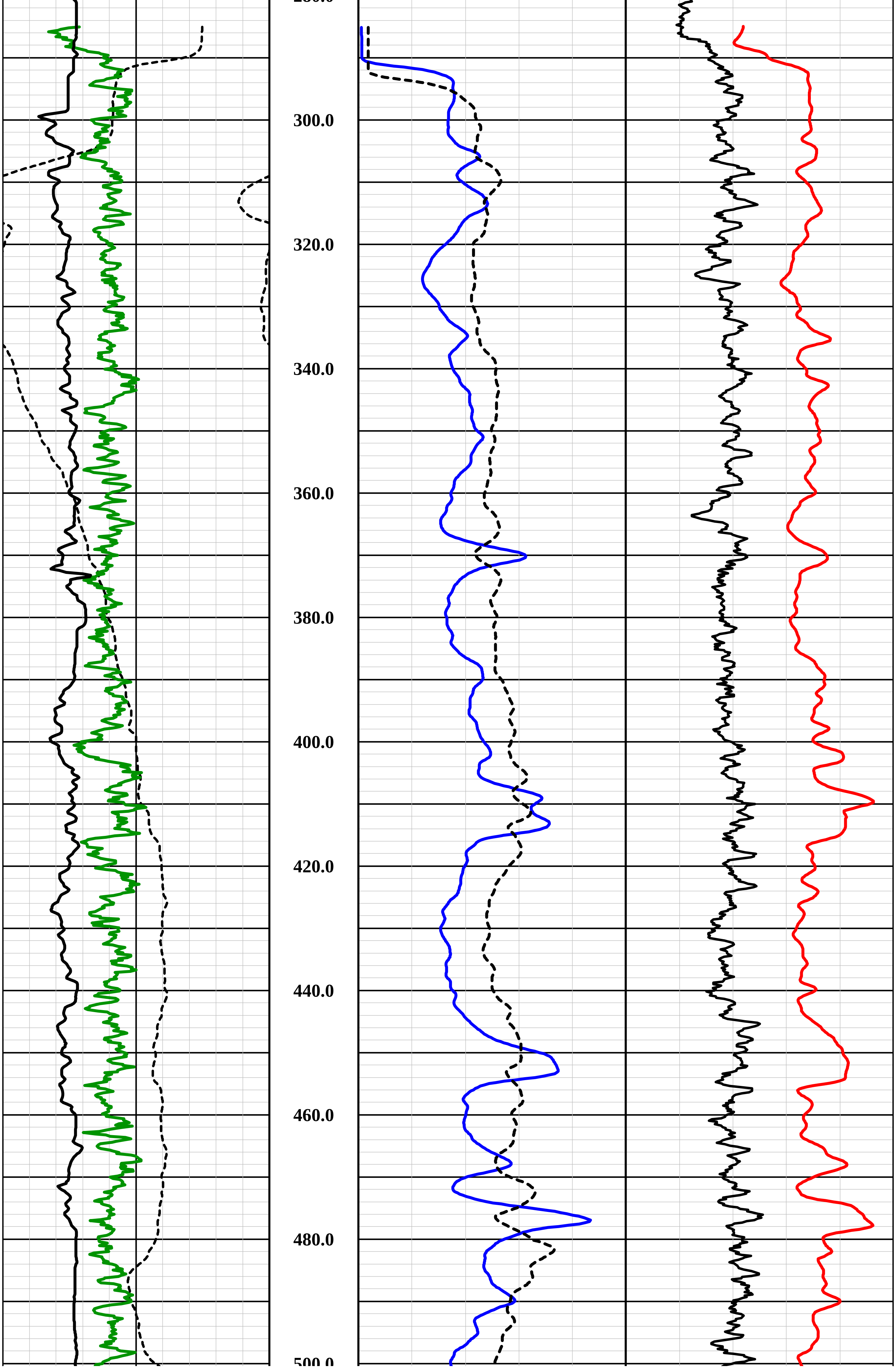
200.0
220.0
240.0
260.0
280.0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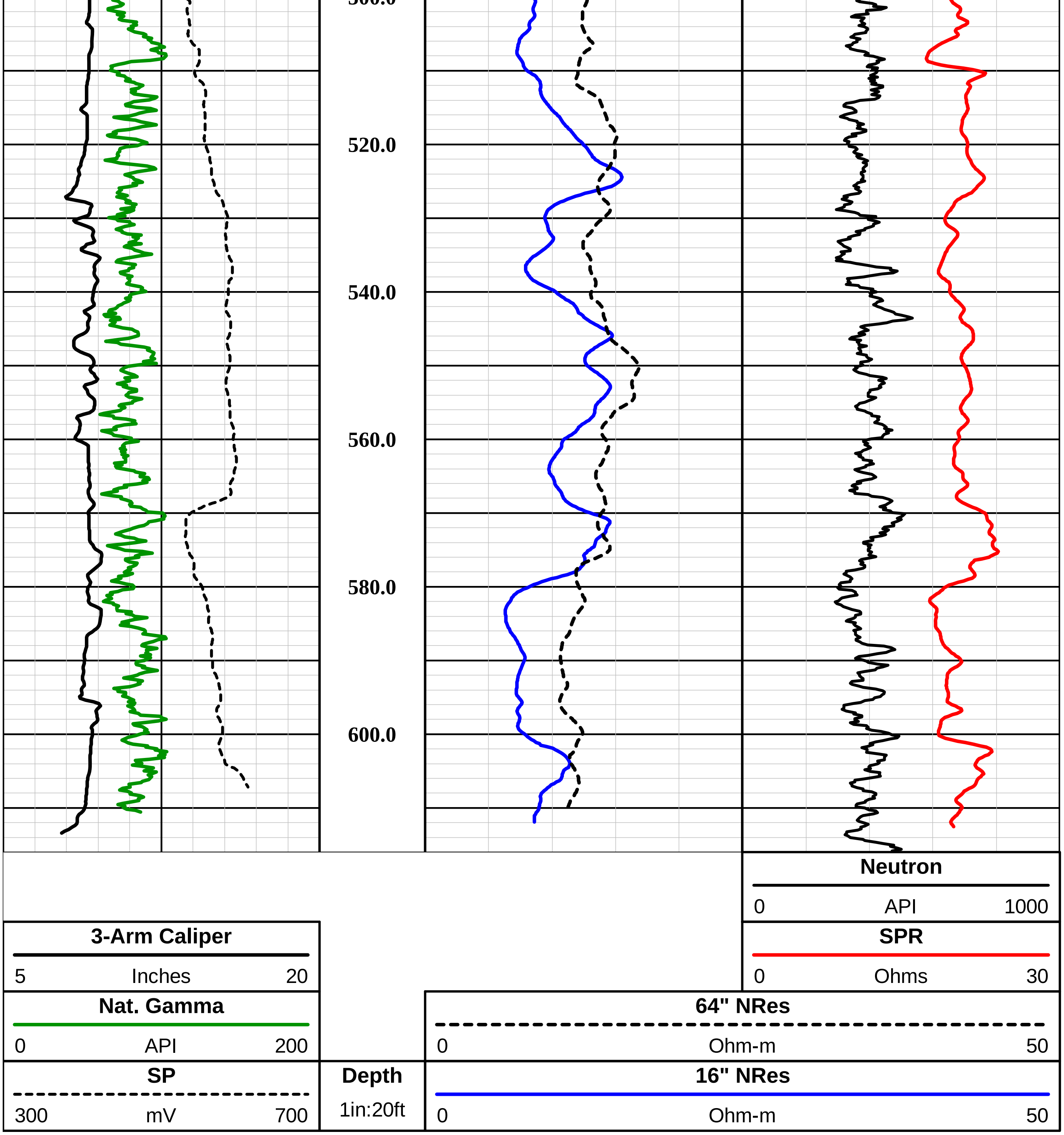
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0


520.0
540.0
560.0
580.0
600.0
Neutron
0 API 1000
SPR
0 Ohms 30
3-Arm Caliper
5 Inches 20
Nat. Gamma
0 API 200
64" NRes
0 Ohm-m 50
SP
300 mV 700
Depth
1in:20ft
16" NRes
0 Ohm-m 50

APPENDIX J

LAND AND WATER USE QUESTIONNAIRES

LAND AND WATER USE STUDY QUESTIONNAIRE
FOR UTILITIES WITHIN THE
COOPER ROAD AND COMMERCE AVENUE WQARF REGISTRY SITE

Please answer all questions. Mark "NA" for questions that are not applicable. Mark "UNK" if the answer is unknown to you at the time of completion. Please attach any additional pages as needed.

Utility name: Salt River Project

Date Questionnaire was completed: 6/28/2013

Name of person completing Questionnaire: Andrea Martinez

Contact Name: Same

Title: Sr. Environmental Engineer

Division: Environmental

Address: PAB 352, PO BOX 52025
Phoenix AZ 85072

Phone Number: 602-236-2618

1. What is the current use of your utility's property within the area of the Cooper Road and Commerce Avenue WQARF site? (Boundaries are: to the north by Encinas Street, to the south by the Neely Ranch Preserve, to the east by the Neely Street and to the west by Ocotillo Drive.

Power transmission and distribution lines, irrigation turnout structures, laterals, and a wellsite.

2. Please list the utility's properties of concern/boundaries (neighborhood planning committees, zoning, canals, wells, etc.) within the WQARF site boundary.

no concerns.

3. What are the foreseeable plans for the utility's property within the WQARF site boundary as far into the future as they are known and up to 100 years, if possible?

   Future plans are dictated by water and power service expansions in the area. Since the area is built out, service expansions should be limited.

4. Does the utility have a published general plan for the property within the WQARF site boundary?

   No, all major utilities are in place.

5. Are parcel, zoning, or land and water use maps available through the utility? Where are they located?

   Not available.

6. Please list any specific concerns the utility is aware of within the WQARF site boundaries? Please list future concerns (e.g. - freeway expansion, water use, water availability, etc.)

   No concerns within the boundaries, except water quality.

7. Please list any future zoning plans or area plans for the utility within the WQARF site boundary.

   None, SRP does not do zoning.

8. Please list any "special projects" projected or anticipated within the WQARF site boundary.

No "special projects", routine maintenance and operation of existing facilities.

9. If any property is leased (the utility is the lessor), how long is the lease term?

No lease property within site boundary.

10. If the property is leased, are there plans to renew the lease and if so, for how long?

N/a

11. Please list any environmental spill of material or waste products that has occurred within the utility's property within the WQARF site boundary in the past 5 years?

None

12 Is the utility currently sampling groundwater wells in the WQARF site? If so, how often is the sampling conducted? Are analytical results being submitted to ADEQ for the groundwater database?

Yes, annually and submitted to ADEQ.
SRP well names/coordinates are 29.0E -1.0S, 29.0E - 1.5S, 29.0E - 2.0S.

13. Does your utility have an environmental manager or do you outsource environmental management to an environmental consulting firm? If so, please provide the following information:

Name: Dave Sultaner
Title: Manager, Water Quality, Waste Management, Field Services
Address: Mail Stop PAB 352, PO Box 52025, Phoenix AZ 85072
Phone Number: 602-236-8118

14. Please indicate anticipated groundwater development by the utility within the WQARF site boundary.

No new wells are currently planned.

15. Are there any groundwater wells owned by the utility in the vicinity of or that have been affected by the WQARF site? If so, please list the well identification numbers and ADWR well registry numbers. What is the current status of these wells (e.g. – shut down, still pumping)?

29E-1S	D(1-5) 11 AAA	55-542431	Active
29E-1.5S	D(1-5) 12 CBB	55-617105	Active (last on/first off)
29E-2S	D(1-5) 12 CCC	55-617104	Active

16. What is the future use (up to 100 years) for any wells that have been impacted by the WQARF site?

SRP delivers nearly 1,000,000 acre-feet of water per year to the metro-Phoenix area, in normal runoff years, most of that is supplied from surface water from the Salt and Verde Rivers. However, in dry years, groundwater must be pumped to supplement the surface water supplies. SRP's water supply wells are a critical resource especially in drought conditions and it is very important to SRP that it have a reliable supply of water available in such situations.

Thank you for your time. The Project Manager, Scott Goodwin, or a representative from ADEQ's consultant, Hydro Geo Chem, may follow-up on answers provided.

LAND AND WATER USE STUDY QUESTIONNAIRE
FOR MUNICIPALITIES WITHIN THE
COOPER ROAD AND COMMERCE AVENUE WQARF REGISTRY SITE

Please answer all questions. Mark "NA" for questions that are not applicable. Mark "UNK" if the answer is unknown to you at the time of completion. Please attach any additional pages as needed.

Municipality name: Town of Gilbert__

Date Questionnaire was completed: July 17, 2013__________________

Name of person completing Questionnaire: Patricia Jordan_________________

Contact Name: _Patricia Jordan_____________________

Title: _Utility Supervisor, Wastewater Recharge

Division: __Public Works___________________

Address: __Gilbert SASC___________________

4760 S. Greenfield Rd. Bldg. A

Gilbert, AZ 85297______________

Phone Number: _(480) 503-6439____________________

1. What is the current use of your municipality properties within the area of the Cooper Road and Commerce Avenue WQARF site? (Boundaries are: Encinas Street, to the south by the Neely Ranch Preserve, to the east by the Neely Street and to the west by Ocotillo Drive.

   From north-west to south east of the boundary: Drinking Water Well 15 (shared with SRP), monitoring well G-9, roadway easements/power line easements and wells G7, 8 and 9, Neely Wastewater Treatment Plant and the Neely Recharge Facility, then Drinking water well 14.

2. Please list the municipality's properties of concern/boundaries (neighborhood planning committees, zoning, canals, wells, etc.) within the WQARF site boundary.

   Drinking Water well 15, monitoring wells g-7, g-8, g-9, g-10, Drinking Water well 14

3. What are the foreseeable plans for the municipality's property within the WQARF site boundary as far into the future as they are known and up to 100 years, if possible?

    Neely Recharge Facility – increase recharge flows with ADEQ/ADWR permission.

4. Does the municipality have a published general plan for the property within the WQARF site boundary?

    Yes

5. Are parcel, zoning, or land maps available through the municipality? Where are they located?

    http://www.gilbertaz.gov/areamaps/default.cfm

    http://www.gilbertaz.gov/planning/GenPlan2012.cfm

6. Please list any specific concerns the municipality is aware of within the WQARF site boundaries? Please list future concerns (e.g. - freeway expansion, water use, water availability, etc.)

    Gilbert is concerned about the effect of the WQARF site on the water quality of drinking water wells 15 and 14 and the continued effect of the site on the recovery wells G-7, 8, and 10. Gilbert would also like to increase recharge flows at the Neely Recharge Facility.

7. Please list any future zoning plans or area plans for the municipality within the WQARF site boundary.

    None

8. Please list any "special projects" projected or anticipated within the WQARF site boundary.

    None

9. If any property is leased (the municipality is the lessor), how long is the lease term?

   Gilbert has no leases in that area.

10. If the property is leased, are there plans to renew the lease and if so, for how long?

    Gilbert has no leases in that area.

11. Please list any environmental spill of material or waste products that has occurred within the municipality within the WQARF site boundary in the past 5 years?

    There have been no occurrences in the site boundary, in the past 5 years.

12 Is the municipality currently sampling groundwater wells in the WQARF site? If so, how often is the sampling conducted? Are analytical results being submitted to ADEQ for the groundwater database?

Gilbert Water Quality group performs Safe Drinking Water Act (SDWA) sampling and testing of SRP Well 15 and Gilbert Well 14. This testing includes various volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs) and inorganic chemicals. These tests are completed on a range of regulation- required time periods ranging from quarterly to once every three or nine years. Results are submitted to Maricopa County and AZDEQ (Drinking Water Division). Gilbert Water Quality Group does not submit the results to the ADEQ groundwater database.

The Gilbert Wastewater Recharge Section samples monitoring wells G-7, 8, 9 and 10 at least quarterly to comply with the Neely Recharge Facility APP 102716. Those results are submitted to ADEQ per the recharge facility permit and also to the WQARF section for their information.

13. Does your municipality have an environmental manager or do you outsource environmental management to an environmental consulting firm? If so, please provide the following information:

Name: Jessica Koberna
Title: Environmental and Safety Coordinator
Address: 50 E. Civic Center Dr. Gilbert, AZ 85296
Phone Number: (480) 503-6421

14. Please indicate anticipated groundwater development by the municipality within the WQARF site boundary.

Gilbert may develop future water supply wells in the WQARF area as the Town population grows and as existing water supply wells may become inoperative. While there are no documented plans for future groundwater development at this time, the area is of strategic importance to the utility due to the existing infrastructure for supporting groundwater wells (connecting water transmission main, high power electrical supply, adequate site area for equipment, etc).

15. Are there any groundwater wells owned by the municipality in the vicinity of or that have been affected by the WQARF site? If so, please list the well identification numbers and ADWR well registry numbers. What is the current status of these wells (e.g. – shut down, still pumping)?

Gilbert utilizes SRP Well 15 for municipal water supply. This well is inside the described area.

Gilbert's municipal water supply Well 14 is located to the southeast of the described area. Both of these wells are in routine use for municipal water supply.

Well Identification Number	ADWR Well Registry Number
Gilbert Well 14	55-534889
SRP Well 15	55-542431

Wastewater Recharge's monitoring well G-9, #55-539953 is used for sampling only.

Wastewater Recharge's Recovery/Monitoring wells G-7, #55-524081, G-8, #55-524082, G-10, #55-539954 – these wells are not being used as designed to recover groundwater for our customers. They are currently only used for sampling.

16. What is the future use (up to 100 years) for any wells that have been or may be impacted by the WQARF site?

The Drinking Water wells listed above are planned for ongoing use for the foreseeable future.

If the groundwater quality clears up around the Neely RF, the G-wells listed above can be used for recovered groundwater again.

Thank you for your time. The Project Manager, Scott Goodwin, or a representative from ADEQ’s consultant, Hydro Geo Chem, may follow-up on answers provided.

APPENDIX K

RISK CALCULATIONS

Site-specific

Resident Equation Inputs for Tap Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_r (exposure duration - resident) year	30
ED_c (exposure duration - child) year	6
ED_a (exposure duration - adult) year	24
ED_{0-2} (mutagenic exposure duration first phase) year	2
ED_{2-6} (mutagenic exposure duration second phase) year	4
ED_{6-16} (mutagenic exposure duration third phase) year	10
ED_{16-30} (mutagenic exposure duration fourth phase) year	14
THQ (target hazard quotient) unitless	1
LT (lifetime - resident) year	70
EF_r (exposure frequency) day/year	350
EF_{0-2} (mutagenic exposure frequency first phase) day/year	350
EF_{2-6} (mutagenic exposure frequency second phase) day/year	350
EF_{6-16} (mutagenic exposure frequency third phase) day/year	350
EF_{16-30} (mutagenic exposure frequency fourth phase) day/year	350
ET_{rw-adj} (age-adjusted exposure time) hour/day	0.664
$ET_{rw-madj}$ (mutagenic age-adjusted exposure time) hour/day	0.664
ET_{rwa} (adult tapwater exposure time) hour/day	0.58
ET_{rwc} (child tapwater exposure time) hour/day	1
ET_{rw} (exposure time - resident) hour/day	24
ET_{0-2} (mutagenic exposure time first phase) hour/event	1
ET_{2-6} (mutagenic exposure time second phase) hour/event	1
ET_{6-16} (mutagenic exposure time third phase) hour/event	0.58
ET_{16-30} (mutagenic exposure time fourth phase) hour/event	0.58
BW_a (body weight - adult) kg	70
BW_c (body weight - child) kg	15
IRW_a (water intake rate - adult) L/day	2
IRW_c (water intake rate - child) L/day	1
EV_{rwa} (adult events) per day	1
EV_{rwc} (child events) per day	1
EV_{0-2} (mutagenic events first phase) per day	1
EV_{2-6} (mutagenic events first phase) per day	1
EV_{6-16} (mutagenic events first phase) per day	1
EV_{16-30} (mutagenic events first phase) per day	1

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Site-specific

Resident Equation Inputs for Tap Water

Variable	Value
K (volatilization factor of Andelman) L/m^3	0.5
IFW_{adj} (adjusted intake factor) L-year/kg-day	1.086
$IFWM_{adj}$ (mutagenic adjusted intake factor) L-year/kg-day	3.39
DFW_{adj} (age-adjusted dermal factor) cm^2-event/kg	8811.4
$DFWM_{adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	25394.29
SA_a (skin surface area - adult) cm^2	18000
SA_c (skin surface area - child) cm^2	6600
IRW_{0-2} (mutagenic water intake rate) L/day	1
IRW_{2-6} (mutagenic water intake rate) L/day	1
IRW_{6-16} (mutagenic water intake rate) L/day	2
IRW_{16-30} (mutagenic water intake rate) L/day	2
l_{sc} (apparent thickness of stratum corneum) cm	0.001

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Site-specific

Resident Screening Levels (RSL) for Tap Water

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Chemical Type	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m^3)	RfC Ref	VOC	GIABS	KP
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1	1	0.0334
Trichloroethylene	79-01-6	Yes	Yes	Organics	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1	1	0.0116

Chemical	MW	pi	logds	dsclc	dsc	Concentration (mg/kg)	littleb	B	tstar	tau_event	FA	In EPD?
Tetrachloroethylene	165.83	3.1415927	-3.728648	0.0001868	1.8679E-7	59	0.4132241	0.1654263	2.1414503	0.8922709	1	Yes
Trichloroethylene	131.39	3.1415927	-3.535784	0.0002912	2.9122E-7	15	0.3351426	0.0511406	1.3735485	0.5723119	1	Yes

Chemical	DAeventc	DAeventnc	DAeventna	MCL ug/L	Ingestion SL TR=1.0E-6 (ug/L)	Dermal SL TR=1.0E-6 (ug/L)	Inhalation SL TR=1.0E-6 (ug/L)	Carcinogenic SL TR=1.0E-6 (ug/L)	Ingestion SL Child HQ=1 (ug/L)	Dermal SL Child HQ=1 (ug/L)	Inhalation SL Child HQ=1 (ug/L)
Tetrachloroethylene	0.0039451	0.0142208	0.0243333	5.00E+00	3.20E+01	5.55E+01	1.87E+01	9.74E+00	9.39E+01	1.63E+02	8.34E+01
Trichloroethylene	0.0000625	0.0011851	0.0020278	5.00E+00	4.68E-01	3.16E+00	4.69E-01	2.18E-01	7.82E+00	4.89E+01	4.17E+00

Chemical	Noncarcinogenic SL Child HI=1 (ug/L)	Ingestion SL Adult HQ=1 (ug/L)	Dermal SL Adult HQ=1 (ug/L)	Inhalation SL Adult HQ=1 (ug/L)	Noncarcinogenic SL Adult HI=1 (ug/L)	Screening Level (ug/L)
Tetrachloroethylene	3.48E+01	2.19E+02	3.66E+02	8.34E+01	5.19E+01	9.74E+00 ca**
Trichloroethylene	2.58E+00	1.83E+01	1.10E+02	4.17E+00	3.29E+00	2.18E-01 ca*

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Site-specific

Resident Risk for Tap Water

Chemical	Chemical Type	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m^3)	RfC Ref	VOC	KP	MW	pi	logds	dsclc
Tetrachloroethylene	Organics	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1	0.0334	165.83	3.1415927	-3.728648	0.0001868
Trichloroethylene	Organics	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1	0.0116	131.39	3.1415927	-3.535784	0.0002912
**Total Risk*		*-*		*-*		*-*		*-*		*-*	*-*	*-*	*-*	*-*	*-*

Chemical	dsc	Concentration (mg/kg)	littleb	B	tstar	tau_event	FA	In EPD?	MCL ug/L	Concentration (mg/kg)	Ingestion Risk TR=1.0E-6	Dermal Risk TR=1.0E-6
Tetrachloroethylene	1.8679E-7	59	0.4132241	0.1654263	2.1414503	0.8922709	1	Yes	5.00E+00	59	1.84E-06	1.06E-06
Trichloroethylene	2.9122E-7	15	0.3351426	0.0511406	1.3735485	0.5723119	1	Yes	5.00E+00	15	3.20E-05	4.74E-06
**Total Risk*	*-*	*-*	*-*	*-*	*-*	*-*	*-*		*-*	*-*	*3.39E-05*	*5.81E-06*

Chemical	Inhalation Risk TR=1.0E-6	Carcinogenic Risk TR=1.0E-6	Ingestion Risk Child HQ=1	Dermal Risk Child HQ=1	Inhalation Risk Child HQ=1	Noncarcinogenic Risk Child HI=1	Ingestion Risk Adult HQ=1	Dermal Risk Adult HQ=1	Inhalation Risk Adult HQ=1	Noncarcinogenic Risk Adult HI=1
Tetrachloroethylene	3.15E-06	6.06E-06	6.29E-01	3.62E-01	7.07E-01	1.70E+00	2.69E-01	1.61E-01	7.07E-01	1.14E+00
Trichloroethylene	3.20E-05	6.88E-05	1.92E+00	3.07E-01	3.60E+00	5.82E+00	8.22E-01	1.37E-01	3.60E+00	4.55E+00
**Total Risk*	*3.52E-05*	*7.49E-05*	*2.55E+00*	*6.69E-01*	*4.30E+00*	*7.52E+00*	*1.09E+00*	*2.98E-01*	*4.30E+00*	*5.69E+00*

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Site-specific

Indoor Worker Equation Inputs for Air

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
AT_w (averaging time)	365
EF_w (exposure frequency) d/yr	250
ED_w (exposure duration) years	25
ET_w (exposure time) hours	8
LT (lifetime) yr	70

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Site-specific

Indoor Worker Screening Levels (RSL) for Air

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m^3)	Noncarcinogenic SL HI=1 (ug/m^3)	Screening Level (ug/m^3)
Tetrachloroethylene	127-18-4	No	Yes	2.60E-07	I	4.00E-02	I	4.72E+01	1.75E+02	4.72E+01 ca**

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Site-specific

Indoor Worker Risk for Air

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Concentration (µg/kg)	Carcinogenic Risk TR=1.0E-6	Noncarcinogenic Risk HI=1
Tetrachloroethylene	2.60E-07	I	4.00E-02	I	76	1.61E-06	4.34E-01
**Total Risk*	-		-		-	*1.61E-06*	*4.34E-01*

Output generated 17MAR2014:16:35:18

Site-specific

Indoor Worker Equation Inputs for Air

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
AT_w (averaging time)	365
EF_w (exposure frequency) d/yr	250
ED_w (exposure duration) years	25
ET_w (exposure time) hours	8
LT (lifetime) yr	70

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Site-specific

Indoor Worker Screening Levels (RSL) for Air

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m^3)	Noncarcinogenic SL HI=1 (ug/m^3)	Screening Level (ug/m^3)
Tetrachloroethylene	127-18-4	No	Yes	2.60E-07	I	4.00E-02	I	4.72E+01	1.75E+02	4.72E+01 ca**

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Site-specific

Indoor Worker Risk for Air

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Concentration (µg/kg)	Carcinogenic Risk TR=1.0E-6	Noncarcinogenic Risk HI=1
Tetrachloroethylene	2.60E-07	I	4.00E-02	I	196000	4.16E-03	1.12E+03
**Total Risk*	-		-		-	*4.16E-03*	*1.12E+03*

Output generated 17MAR2014:16:40:45

Site-specific

Indoor Worker Equation Inputs for Air

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
AT_w (averaging time)	365
EF_w (exposure frequency) d/yr	250
ED_w (exposure duration) years	25
ET_w (exposure time) hours	8
LT (lifetime) yr	70

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Site-specific

Indoor Worker Screening Levels (RSL) for Air

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m^3)	Noncarcinogenic SL HI=1 (ug/m^3)	Screening Level (ug/m^3)
Tetrachloroethylene	127-18-4	No	Yes	2.60E-07	I	4.00E-02	I	4.72E+01	1.75E+02	4.72E+01 ca**

Site-specific

Indoor Worker Risk for Air

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Concentration (µg/kg)	Carcinogenic Risk TR=1.0E-6	Noncarcinogenic Risk HI=1
Tetrachloroethylene	2.60E-07	I	4.00E-02	I	1.45	3.07E-08	8.28E-03
**Total Risk*	*-*		*-*		*-*	*3.07E-08*	*8.28E-03*

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APPENDIX L

REMEDIAL OBJECTIVES REPORT

REMEDIAL OBJECTIVES REPORT
COOPER ROAD AND COMMERCE AVENUE
WQARF REGISTRY SITE
GILBERT, ARIZONA

February, 2015

Arizona Department of Environmental Quality
Remedial Projects Unit
1110 West Washington
Phoenix, Arizona 85007

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LIST OF ABBREVIATIONS & ACRONYMS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
A.R.S.	Arizona Revised Statutes
AS/SVE	Air Sparge/Soil Vapor Extraction
AWQS	Aquifer Water Quality Standard
BGS	Below Ground Surface
CAP	Central Arizona Project
COC	Chemicals of Concern
ERA	Early Response Action
FS	Feasibility Study
Ft/day	Feet Per Day
GI	General Industry
LI	Light Industrial
MCL	Maximum Contaminant Level
µg/L	Micrograms Per Liter
Mg/kg	Milligrams per Kilogram
MGD	Million Gallons Per Day
NRF	Neely Recharge Facility
PCE	Tetrachloroethene
RI	Remedial Investigation
RO	Remedial Objective
ROD	Record Of Decision
rSRLs	Residential Soil Remediation Levels
RWCD	Roosevelt Water Conservation District
SRP	Salt River Project Agricultural Improvement and Power District
TCE	Trichloroethene
TOG	Town Of Gilbert
VOC	Volatile Organic Compound
WQARF	Water Quality Assurance Revolving Fund
WRF	Water Reclamation Facilities

1.0 INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) has prepared this Proposed Remedial Objectives (ROs) report for the Cooper Road and Commerce Avenue Water Quality Assurance Revolving Fund (WQARF) Registry Site (the Site) to meet requirements established under Arizona Administrative Code (A.A.C.) R18-16-406. This RO report relies upon the land and water use study questionnaires collected in 2013 and the solicitation of proposed Remedial Objectives during the comment period on the Draft Remedial Investigation report (RI) in 2014. The land and water use questionnaires are included in Appendix I of the RI Report prepared by Hydro Geo Chem for ADEQ.

ROs are established for the current and reasonably foreseeable uses of land and waters of the state that have been or are threatened to be affected by a release of a hazardous substance. Pursuant to A.A.C. R18-16-406(D), it is specified that reasonably foreseeable uses of land are those likely to occur at the site and the reasonably foreseeable uses of water are those likely to occur within one hundred years unless site-specific information suggests a longer time period is more appropriate.

Reasonably foreseeable uses are those likely to occur, based on information provided by water providers, well owners, land owners, government agencies, and others. Not every use identified in the RI report will have a corresponding RO. Uses identified in the RI report may or may not be addressed based on information gathered during the public involvement process, limitations of WQARF, and whether the use is reasonably foreseeable.

The ROs must be stated in the following terms: (1) protecting against the loss or impairment of each use; (2) restoring, replacing, or otherwise providing for each use; (3) when action is needed to protect or provide for the use; and (4) how long action is needed to protect or provide for the use.

The ROs chosen for the site will be evaluated in the feasibility study (FS) phase of the WQARF process. The FS will evaluate specific remedial measures and strategies required to meet ROs. A remedial strategy is one or a combination of six general strategies identified in Paragraph B.4 of Arizona Revised Statutes (A.R.S.) § 49-282-06 (plume remediation, physical containment, controlled migration, source control, monitoring, and no action.) A.R.S. § 49-282-06(B)(4)(a) indicates that for remediation of soil, the selected remedial action shall be consistent with the soil remediation standards adopted pursuant to A.R.S. § 49-152. A remedial measure is a specific action taken in conjunction with remedial strategies to achieve one or more ROs (for example, well replacement, well modification, water treatment, water supply replacement, and engineering controls.)

The FS will propose at least three remedies (a reference remedy and generally two alternative remedies) capable of meeting ROs. A reference remedy is a combination of remedial strategies and measures capable of achieving ROs, and is compared with alternative remedies for purposes of selecting a proposed remedy. An alternative remedy is a combination of remedial strategies and measures different from the reference remedy; alternative remedies are compared with the reference remedy for purposes of selecting a proposed remedy. Proposed remedies will also be generally compatible with future land use specified by land owners.

Written comments on this proposed RO report will be accepted for a period of 30 days following the release. If significant public interest exists or if significant issues or information are brought to the attention of ADEQ, the comment period may be extended. The final RI report will include a responsiveness summary to written comments received from the public during the comment period. The final RO Report will be an appendix to the final RI Report.

2.0 REMEDIAL OBJECTIVES FOR LAND USE

The Site consists of a contaminated groundwater plume located in the vicinity of Commerce Avenue near Cooper Road in Gilbert, Arizona. The plume is bounded to the north by Encinas Street, to the south by the Neely Ranch Preserve, to the east by the Neely Street and to the west by Ocotillo Drive. Through the RI process the following Contaminants of Concern (COCs) have been identified in soil, soil vapor, and groundwater at the site. The COCs in the groundwater at the site include tetrachloroethene (PCE) and trichloroethene (TCE). Contaminants of concern in the soils at the source area of the Site include PCE, arsenic and copper.

The Site incorporates a groundwater solute plume that is located in the vicinity of the former Unichem International, Inc. (Unichem) facility at 619 West Commerce Road in Gilbert. The main source of contamination at the source area property appears to be a dry well constructed on the property in 1977 in a triangular-shaped sump near the center of the concrete pavement that served as a foundation for the processing plant on site. Soil contamination at depths of approximately 70 feet below ground surface (bgs) near the area of the drywell are know to exceed the residential Soil Remediation Level (rSRLs) for PCE of 5.1 milligrams per kilogram (mg/kg) with concentrations as high as 3,900 mg/kg when last sampled in 2012.

The former Unichem facility has undergone numerous uses and processes, and disposal practices have resulted in soil impacted by PCE, other solvents, cyanide and priority pollutant metals. Groundwater beneath the Site is contaminated with PCE, TCE and arsenic above maximum contaminant levels (MCLs) or Aquifer Water Quality Standards (AWQS). Arsenic is present in soils and groundwater at the site. In the groundwater, there is no spatial pattern to arsenic concentrations that would be consistent with a release. Rather, arsenic appears to be a naturally occurring constituent that is not related to the Site.

An early response action (ERA) was initiated at the Site in 2005. The ERA for the Site included the installation and operation of an air sparge, soil vapor extraction system (AS/SVE) and a groundwater extraction system. The AS/SVE system was intended to address PCE contamination in the vadose zone and groundwater at the former Unichem facility. The groundwater extraction system was also intended to address PCE contamination in the groundwater and effect capture of the PCE solute plume in the source area.

The AS/SVE system operated from December 2008 through August 2014. The AS/SVE system has removed approximately 4,665 pounds of volatile organic compounds (VOCs). The groundwater extraction well and water treatment plant operated from August 2010 to September 2014. The plant treated a cumulative total of over 193 million gallons of groundwater through the end of September 2014. Approximately 41 pounds of VOCs were removed by the groundwater treatment system.

The Site is directly underlain by a fine-grained clayey interval to about 70 feet bgs that overlies a coarse-grained sand and gravel sequence extending to a depth of about 270 feet bgs. Depth to water at the Site is approximately 110 feet bgs. The elevations and thickness of the sand and gravel unit correspond reasonably well with the mapped distribution of the upper alluvial unit of Laney and Hahn.

In the immediate area of the Site, the Town of Gilbert (TOG) uses water from the upper alluvial unit of the aquifer for recreation use. Water for recreation use is currently withdrawn from the shallow aquifer at TOG well R-1, located approximately 4,000 feet west of the source area property.

Underlying the upper alluvial unit at the Site, the sequence of silts, clays and sands are considered to be the middle alluvial unit and provide water to several water supply wells. The middle alluvial unit of the aquifer is used for municipal supply by the TOG. Well TOG #15 produces from an interval of 570 to 950 feet bgs. TOG # 15 is located approximately 2,700 feet northwest of the source area. The deeper aquifer is also used to provide irrigation water for the Salt River Project Agricultural Improvement and Power District (SRP). TOG #15 is jointly operated by the TOG and SRP and identified by SRP as well 29E-1.0S. An additional SRP well, 29E-1.5S, is located 1,400 feet west of the source area property.

In the upper alluvial unit groundwater is migrating at rates ranging from approximately 2.7 feet per day (ft/day) to 3.7 ft/day, and averaging 3.1 ft/day based on water level data collected during year 2013. These are also the expected migration rates of a conservative (non-sorbing) solute assuming no hydrodynamic dispersion, degradation, or volatilization. Dissolved COCs are expected to have migrated in the same direction as groundwater. Groundwater flow directions over the period of observation (2002 – 2013) have ranged from generally westward to generally northwestward.

Currently, PCE in the upper alluvial unit is known to extend at least 3,800 feet to the north, approximately 3,850 feet to the northwest, and at least 3,000 feet to the west of the former Unichem facility.

The upper alluvial unit and the productive horizon in the middle alluvial unit are separated by a several hundred foot thick clayey layer that may serve as an aquiclude, limiting vertical migration of contaminants. However, low concentrations of PCE were detected in 2005 and 2006 in the deep monitoring well, MW-104D, indicating that some hydraulic connection exists between the upper and middle aquifers at the Site. MW-104D is located between the source area property and TOG # 15. The screened interval of MW-104D is from 580 to 610 feet bgs, within the upper portion of the productive interval of TOG #15. PCE is also detected in the recently installed deep monitor well, MW-119D, near SRP well 29E-1.5S. This SRP well is screened across both aquifers, possibly providing a direct conduit between them. Additionally, significant downward vertical gradient exists between the two aquifers suggesting the potential for vertical migration of contaminants.

In the area of the Site, land is zoned by the TOG for General Industrial (GI) uses. The portion of the site bounded to the west by North Cooper Road and to the north by West Guadalupe Road (along the Union Pacific Railroad corridor) is zoned primarily for GI and Light Industrial (LI) uses. Zoned land uses at the portion of the Site situated north of West Guadalupe Road and west of North Cooper Road are primarily Single Family Residential, with some General Commercial, Neighborhood Commercial, and Multi-Family Residential. The small section of the Site located east of North Cooper Road and south of the Western Canal is zoned for Public Facility/Institutional use, and is the location of the Neely Ranch Riparian Preserve (Figure 1).

The source area property is currently owned by K.B. East Properties, L.L.C. and is used for the storage of steel by Skyline Steel, Inc.

2.1 Summary of Current and Reasonably Foreseeable Land Use

Based on the current zoning maps provided by the TOG, the Site is zoned as residential, commercial and light industrial. Based on the responses in the land and water use study questionnaire sent to the TOG, there are no immediate plans to change the land use or zoning for the areas within and adjacent to the Site.

2.2 Soil Remedial Objective

Land in the area of the Site is currently, and will for the foreseeable future, be zoned for residential, commercial and light industrial uses. Therefore, the ROs for land use at the site are:

> **To restore soil conditions to the remediation standards for intended end use specified in A.A.C. R18-7-203 (specifically background remediation standards prescribed in R18-7-204, predetermined remediation standards prescribed in R18-7-205, or site specific remediation standards prescribed in R18-7-206) that are applicable to the hazardous substances identified. This action is needed for the present time and for as long as the level of contamination in the soil threatens its intended end use.**

3.0 REMEDIAL OBJECTIVES FOR GROUNDWATER USE

The land and water use portion of the RI report is an inclusive summary of information gathered from the Arizona Department of Water Resources (ADWR), water providers, municipalities, and land owners.

3.1 Summary of Current and Reasonably Foreseeable Groundwater Use

The TOG's water resources portfolio consists of surface supplies from SRP, the Roosevelt Water Conservation District (RWCD), and the Central Arizona Project (CAP), as well as groundwater from 18 production wells. Additionally, the TOG's reclaimed water program has reduced groundwater pumping in recent years. Surface water supplies are vulnerable to drought conditions, which are predicted to increase in prevalence in the southwest into the future.

TOG potable water use totaled 47,595 acre-feet in 2011, serving 212,084 users. Residential demand accounts for 70% of this water, with the remaining 30% utilized for non-residential uses. The TOG operates two water treatment plants that treat up to 57 million gallons per day (MGD) of SRP, RWCD, and CAP supplied surface water to potable quality. This capacity is slated to be expanded to 59 MGD when required by growth. The 18 potable water supply groundwater wells that yield up to 41.6 MGD of potable water. Seven additional wells are planned, bringing the total potable groundwater production capacity of the TOG to 55 MGD at build-out.

The TOG operates seven non-exempt wells within and near the Site. One TOG drinking water supply well, TOG #15 (ADWR 55-542431), is located approximately 2,700 feet down gradient from the Unichem facility at the southwest corner of West Guadalupe Road and North Cooper Road, within the Site boundaries, and is threatened by the groundwater contamination at the Site. TOG #15, which pumped 134 acre-feet of water in 2011, is jointly operated by SRP and identified by SRP as well 29E-1.0S (Figure 1).

A different non-exempt production well (ADWR 55-541861) was formerly designated as TOG #15, but has not been pumped in roughly a decade and does not currently have a pump installed. However, the former TOG #15 has not been capped or abandoned, and is located approximately 4,000 feet northwest (down gradient) from the Unichem facility. Therefore, the former TOG #15 is threatened by groundwater contamination at the Site although it is not currently in use and there are no plans to do so.

An additional non-exempt TOG drinking water supply well, TOG #14 (ADWR 55-534889), is located roughly 2,600 feet southeast of the Site, along the Union Pacific Railroad corridor between North Neely Street and North Gilbert Road. TOG#14 is up gradient from groundwater contamination at the Site, and pumped 51.3 acre-feet of water in 2011.

The TOG's Neely Recharge Facility (NRF), located immediately south of the former Unichem facility, recharges water from the Neely WRF via 11 recharge basins. The discharges are regulated under Aquifer Protection Permit number P-102716 issued by ADEQ's Water Quality Division. The TOG has partnered with ADEQ in limiting discharge to the NRF recharge basins in order to minimize the impact of groundwater mounding resulting from artificial recharge on the ongoing remediation of contaminants associated with the Site.

The TOG also operates several non-exempt wells in the Site vicinity that are used for recovery of recharged water for irrigation and recreational uses and groundwater monitoring. These are R-1 (ADWR 55-595204), located about 4,000 feet west of the former Unichem facility and currently outside the Site boundary, G-7 and G-8 (ADWR 55-524081 and 55-524082, respectively), located just southeast of the former Unichem facility outside the Site boundary, and G-10 (ADWR 55-539954), located outside the Site boundary just south of the former Unichem facility.

Non-exempt well R-1 pumped 179.6 acre-feet of water in 2011 and is used to supply water to local lakes. Well R-1 is located down gradient from the former Unichem facility, while G-10 is cross, down gradient and G-7 and G-8 are up gradient. PCE was detected at a concentration of 1.1 micrograms per liter (µg/L) in TOG well R-1 when last sampled in April 2014. The AWQS for PCE is 5.0 µg/L. Groundwater contamination at the Site may pose a risk at R-1, as the western plume boundary has not been well-delineated. Due to groundwater contamination at the Site, the TOG limits the pumping of groundwater recovery wells G-7, G-8 and G-10 located at the NRF. In the past, and depending on the groundwater flow direction, well G-10 has been impacted from the Site.

The TOG applied in late 2013 to ADWR and ADEQ for permission to incrementally increase recharge flows at the NRF so as to increase accrual of groundwater storage credits, and hopes to use wells G-7, G-8, and G-10 for recovery of recharged water once groundwater quality in the area improves.

Wells G-7, G-8, and G-10 are also utilized for groundwater monitoring purposes, along with designated NRF monitor well G-9 located within the Site (Figure 1).

SRP operates various power transmission and distribution lines, irrigation turnout structures, lateral canals, and three non-exempt groundwater supply wells used for irrigation, recreational, and municipal supply in the vicinity of the Site. 29E-1.0S (TOG #15; ADWR 55-542431), 29E-1.5S (ADWR 55-617105), and 29E-2.0S (ADWR 55-617104).

SRP 29E-1.5S is located approximately 1,400 feet west, down gradient of the former Unichem facility at the southeast corner of North Cooper Road and the Western Canal. PCE was first detected in this well at a concentration of 1.3 µg/L in 2007; a sample collected in 2009 detected PCE at a concentration 12.4 µg/L. As part of a May 25, 2010 agreement between ADEQ and SRP regarding the discharge of treated groundwater from the Site to SRP Lateral 9.5, SRP agreed to minimize pumping of SRP well 29E-1.5S except under drought conditions and to meet short-term operational requirements. SRP well 29E-1.5S was completed in 1949 to a depth of 596 feet bgs, with a screened interval straddling the upper and middle alluvial aquifers from 210 to 580 feet bgs. SRP well 29E-1.5S was permitted as a recovery well in 1990 and allotted 150 acre-feet per year in pumpage to maintain artificial lakes in the area. Total pumpage from SRP well 29E-1.5S was 1.4 acre-feet in 2011.

SRP well 29E-2.0S, at the northeast corner of West Elliot Road and North Cooper Road, is located up gradient of the former Unichem facility, outside the Site boundaries, and has not been impacted by groundwater contamination at the Site. SRP well 29E-2.0S was completed in 1940 to a total depth of 400 feet bgs with a screened interval straddling the upper and middle alluvial aquifers from 124 to 385 feet bgs. Total pumpage from SRP well 29E-2.0S was 24.9 acre-feet in 2009.

Based on the responses in the land and water use study questionnaire sent to SRP, there are no current plans for further development of infrastructure or groundwater resources in the vicinity of the Site, as the area is largely built-out. Water quality concerns at the Site are of interest to SRP, as groundwater plays a key role in making up drought-induced shortages in their service area.

The only other non-exempt well located within 1.0 mile of the Site is EW-101, the extraction well operated by ADEQ as part of ERA activities.

The Maricopa Association of Governments owns three exempt wells that are used as monitoring wells, and designated by the TOG as G-1, G-2, and G-5. All three of these wells are completed in the upper alluvial unit. Wells G-1 and G-2 are located south of the former Unichem facility outside the Site boundary, and are up gradient of contamination at the Site. Therefore, groundwater contamination at the Site would not be expected to threaten G-1 and G-2 were they to be used as exempt production wells. Well G-5 is located one mile to the northwest of the former Unichem facility near the corner of North Nevada Street and West Encinas Street, down gradient of contamination at the Site. The concentration of PCE was not detected in an October 2013 sample from ADEQ monitoring well MW-113 located approximately 0.3 miles south east of G-5. PCE has been detected at concentrations below the AWQS for PCE of 5 µg/L at MW-113 since it was installed in 2011, and groundwater contamination from the Site could threaten G-5 were it to be used as an exempt production well rather than a monitoring well (Figure 1).

There are four privately-owned, exempt wells within one mile of the Site (Figure 1). No pumping data are available for these wells, which are listed as domestic water production wells. The E.W. Cooley well (ADWR 55-636808) has a listed location immediately west of TOG #15, down gradient of contamination at the Site. The Eldon Cooley well (ADWR 55-636811) is listed as being approximately 4,700 feet northwest (down gradient) of the former Unichem facility. Notably, ADWR was unable to locate both of these wells (55-636808 and 55-636811) during a 2005 inventory of wells in the area, and they may have been destroyed without being officially abandoned. The Hunter Ditch Lining well (ADWR 55-635924) is located approximately 1,200 feet northwest (down gradient) of the former Unichem facility and is believed to be damaged and unusable. If these well exist or are usable, due to their down gradient location, these three wells may be threatened by groundwater contamination at the Site.

The L.M. Pace well (ADWR 55-634676) has a listed location approximately 2,400 feet southwest (cross gradient) of the former Unichem facility, and is therefore likely not at risk from contamination at the Site. ADWR was also unable to locate the L.M. Pace well during its 2005 inventory of wells in the area, and this well may have been destroyed without being officially abandoned (Figure 1).

3.2 Groundwater Remedial Objective

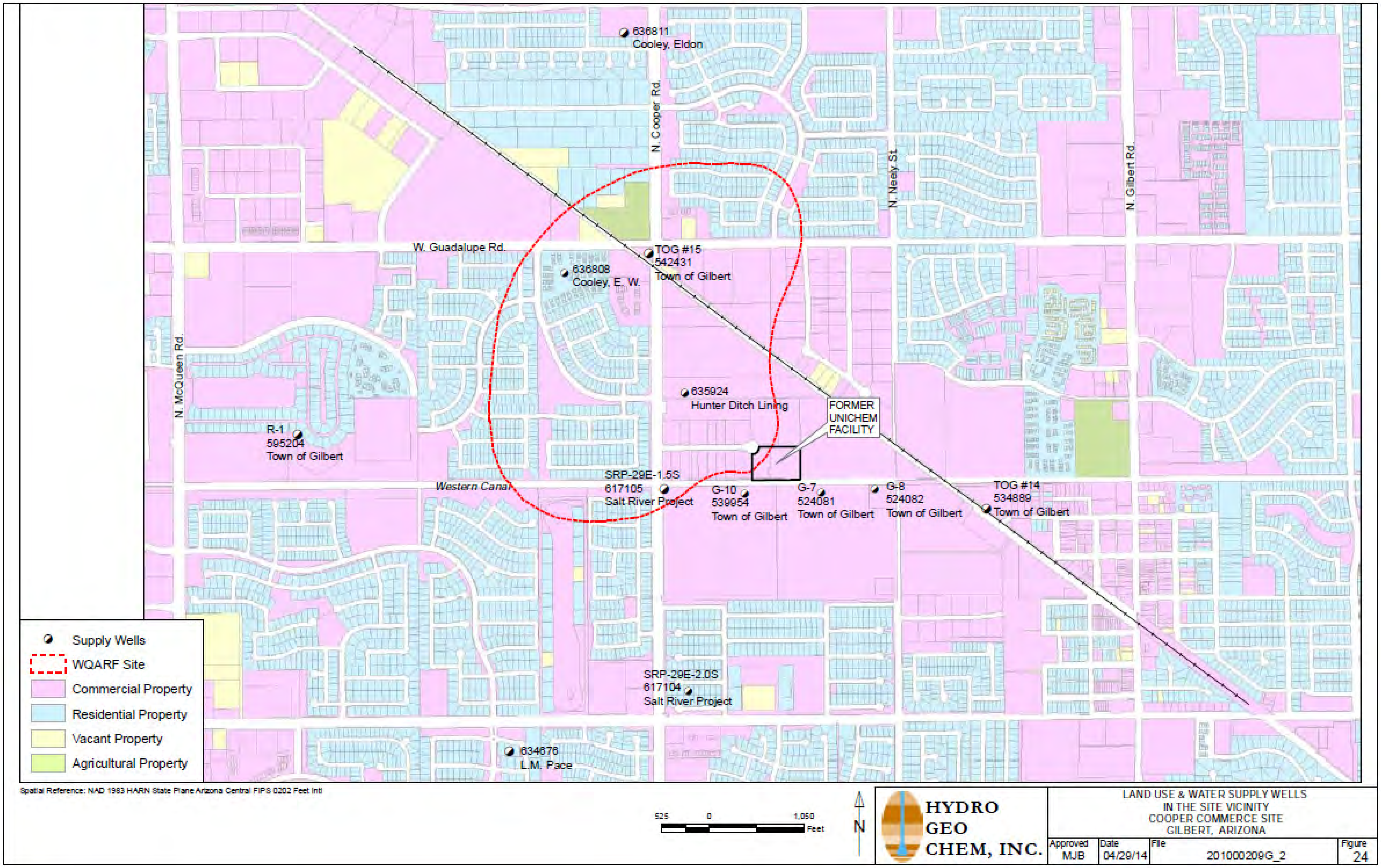
Current groundwater use in the area of the site is for municipal, irrigation and recreational uses. The RO for groundwater at the site is:

> **To protect, restore, replace or otherwise provide a water supply for potable or non-potable use by currently impacted, municipal, domestic, agricultural/irrigation and recreational well owners within or near the Cooper Road and Commerce Avenue WQARF site if the current and reasonably foreseeable future uses are impaired or lost due to contamination from the Site. Remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the Cooper Road and Commerce Avenue WQARF site prohibits or limits the use of groundwater for its intended end use. Remedial actions to meet ROs will be implemented upon issuance of the ROD. If there is an imminent risk to human health or the environment, then an ERA may be initiated prior to implementation of the ROD.**

4.0 REMEDIAL OBJECTIVES FOR SURFACE WATER USE

The land and water use evaluation section of the RI report identified no uses of surface water in the area of the site. Therefore there are no remedial objectives required for surface water.

Figure 1


636811
Cooley, Eldon
N. Cooper Rd.
N. Neely St
N. Gilbert Rd.
W. Guadalupe Rd.
TOG #15
542431
Town of Gilbert
636808
Cooley, E. W.
N. McQueen Rd.
635924
Hunter Ditch Lining
FORMER
UNICHEM
FACILITY
R-1
595204
Town of Gilbert
Western Canal
SRP-29E-1.5S
617105
Salt River Project
G-10
539954
Town of Gilbert
G-7
524081
Town of Gilbert
G-8
524082
Town of Gilbert
TOG #14
534889
Town of Gilbert
SRP-29E-2.0S
617104
Salt River Project
634676
L.M. Pace
● Supply Wells
▭ WQARF Site
🟪 Commercial Property
🟦 Residential Property
🟨 Vacant Property
🟩 Agricultural Property
Spatial Reference: NAD 1983 HARN State Plane Arizona Central FIPS 0202 Feet Intl
525
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N
HYDRO
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CHEM, INC.
LAND USE & WATER SUPPLY WELLS
IN THE SITE VICINITY
COOPER COMMERCE SITE
GILBERT, ARIZONA
Approved
MJB
Date
04/29/14
File
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Figure
24

APPENDIX M

RESPONSIVENESS SUMMARY

REMEDIAL INVESTIGATION AND REMEDIAL OBJECTIVES RESPONSIVENESS SUMMARY

COOPER ROAD AND COMMERCE AVENUE
WQARF REGISTRY SITE
GILBERT, ARIZONA

April 2015

Arizona Department of Environmental Quality
Remedial Projects Unit
1110 West Washington
Phoenix, Arizona 85007

LIST OF ABBREVIATIONS & ACRONYMS

A.A.C	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
A.R.S.	Arizona Revised Statutes
CAB	Community Advisory Board
ROs	Remedial Objectives
WQARF	Water Quality Assurance Revolving Fund

REMEDIAL INVESTIGATION AND REMEDIAL OBJECTIVES RESPONSIVENESS SUMMARY

COOPER ROAD AND COMMERCE AVENUE
WQARF REGISTRY SITE
GILBERT, ARIZONA

INTRODUCTION

Pursuant to the requirements of the Arizona Administrative Code (A.A.C) R-18-16-406(H) the Arizona Department of Environmental Quality (ADEQ) has prepared this comprehensive responsiveness summary for comments received on the Cooper Road and Commerce Avenue Water Quality Assurance Revolving Fund (WQARF) Registry Site (the Site) Remedial Investigation Report and Proposed Remedial Objectives. The comment period for the Draft Remedial Investigation Report and the solicitation of Remedial Objectives (ROs) was opened on November 23, 2014 for 60 days. The comment period for the Proposed Remedial Objectives was opened on February 19, 2015 for 30 days. ADEQ received two comments.

***Comment by the Community Advisory Board (CAB) at December 8, 2014 Meeting*:**
The CAB requested the ROs for the site be based on the Arizona Aquifer Water Quality Standards.

ADEQ Response:
ADEQ wrote the remedial objectives for the site with this comment in mind. Specifically the ROs for groundwater indicate remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the Cooper Road and Commerce Avenue WQARF site prohibits or limits the use of groundwater for its intended end use. Arizona Revised Statutes (A.R.S.) § 49-224(B) classifies all aquifers in the state for drinking water protected use.

Town of Gilbert, written comment on ROs received March 18, 2015
Thank you very much for including Gilbert's infrastructure such as recovery/drinking water wells and the Neely Recharge Facility in the Proposed Remedial Objectives Report. Gilbert would like the department to continue with treatment such as plume remediation and source control in the soil and groundwater of the Cooper and Commerce site until drinking water standards have been met. The preservation of our current and future water resources is of utmost importance.

ADEQ Response:
As stated above, ADEQ believes the ROs for the site address this comment.

APPENDICES A THROUGH M
LOCATED ON CD

APPENDIX A: DETAILS OF DRILLING AND WELL CONSTRUCTION ACTIVITIES

APPENDIX B: MONITORING WELL DEVELOPMENT AND SURVEY DATA

APPENDIX C: IDW INFORMATION

APPENDIX D: LITHOLOGIC LOGS AND WELL CONSTRUCTION DIAGRAMS FOR MONITORING WELLS

APPENDIX E: LITHOLOGIC LOGS AND WELL CONSTRUCTION DIAGRAMS FOR SVE WELLS, VAPOR PROBES, AND EXTRACTION WELL

APPENDIX F: MONTHLY WATER LEVEL HYDROGRAPHS

APPENDIX G: GROUNDWATER ELEVATION CONTOUR MAPS

APPENDIX H: PCE CONCENTRATION CONTOUR MAPS

APPENDIX I: BOREHOLE GEOPHYSICAL LOGS

APPENDIX J: LAND AND WATER USE QUESTIONNAIRES

APPENDIX K: RISK CALCULATIONS

APPENDIX L: REMEDIAL OBJECTIVES REPORT

APPENDIX M: RESPONSIVENESS SUMMARY